

No. 691,927.

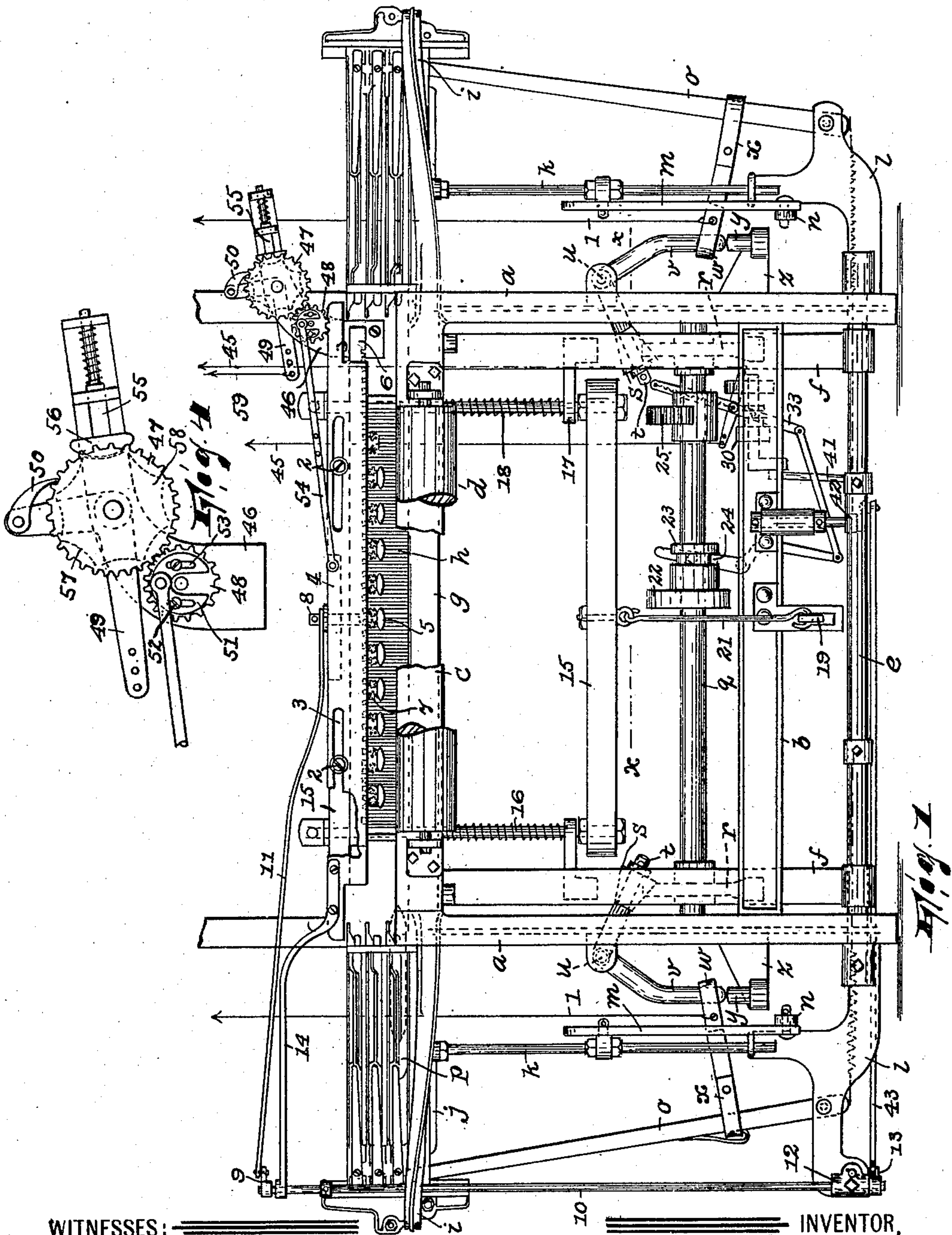
Patented Jan. 28, 1902.

R. ATHERTON.
SWIVEL LOOM.

(Application filed July 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

Wm. S. Bell.
Robert J. Pollitt

INVENTOR,

Robert Atherton,

BY

Partners & Leonard,
ATTORNEYS.

No. 691,927.

Patented Jan. 28, 1902.

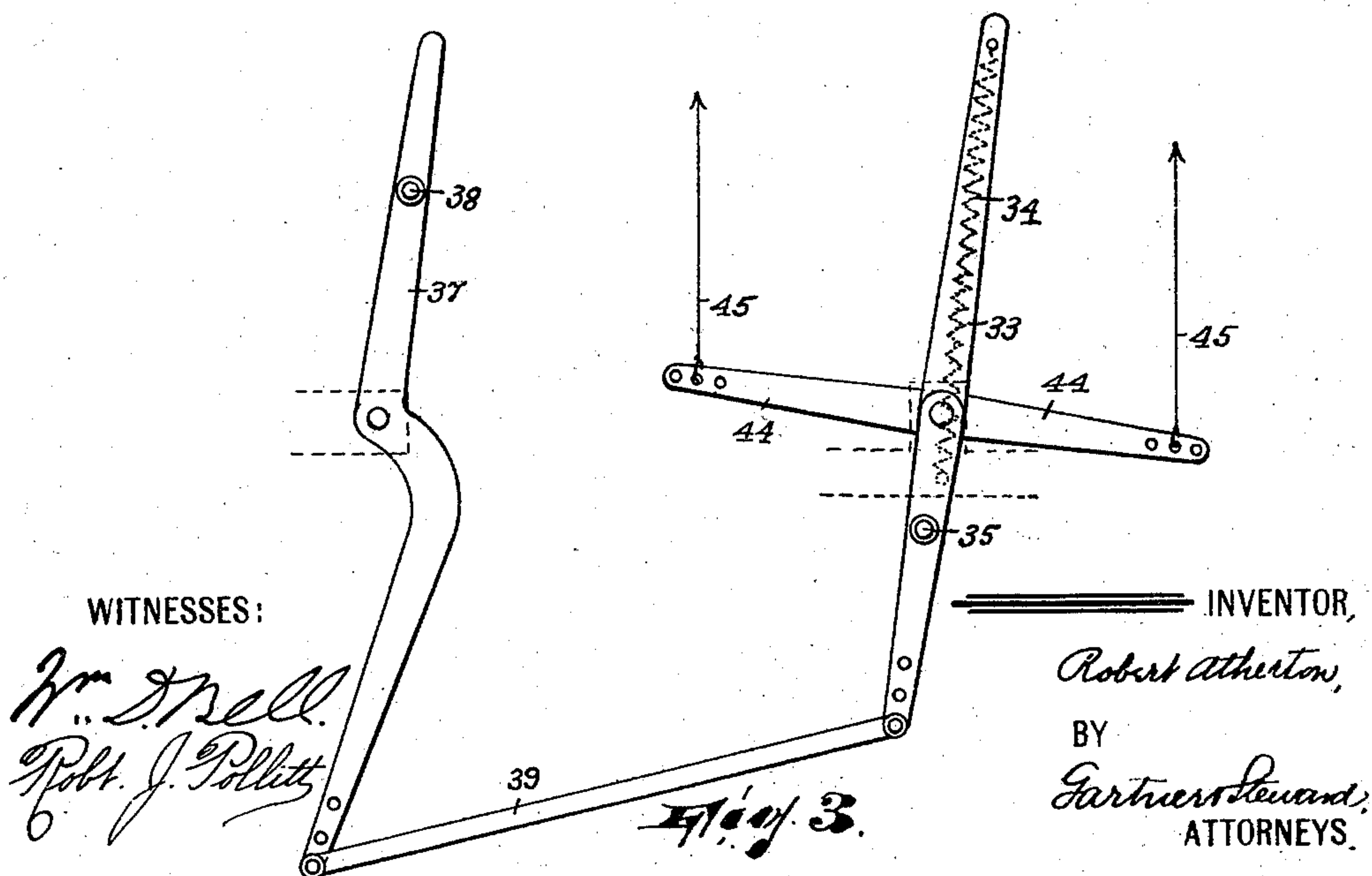
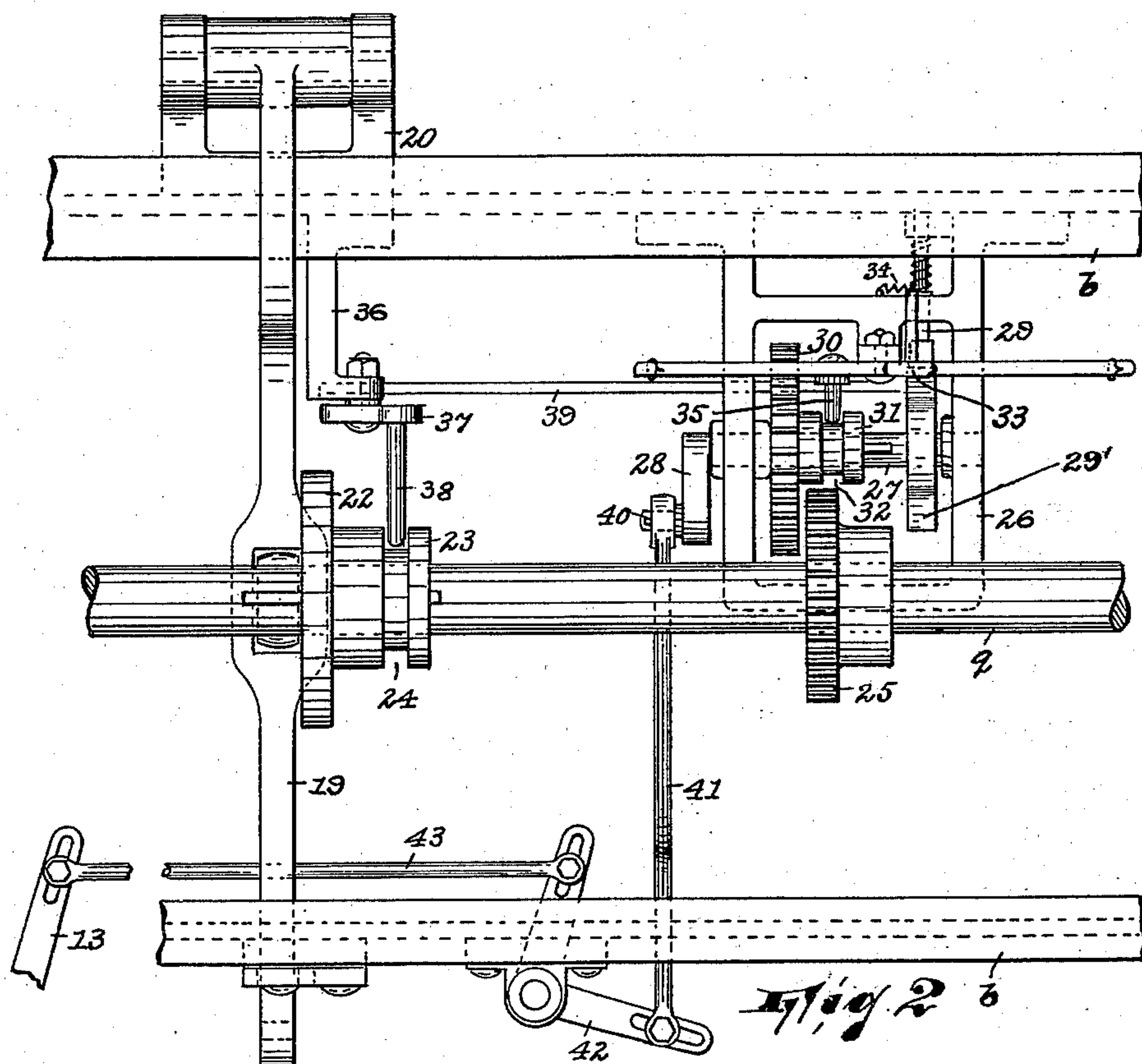
R. ATHERTON.

SWIVEL LOOM.

(Application filed July 27, 1901.)

(No Model.)

2 Sheets—Sheet 2.



UNITED STATES PATENT OFFICE.

ROBERT ATHERTON, OF PATERSON, NEW JERSEY.

SWIVEL-LOOM.

SPECIFICATION forming part of Letters Patent No. 691,927, dated January 28, 1902.

Application filed July 27, 1901. Serial No. 69,911. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ATHERTON, a citizen of the United States, residing in Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Swivel-Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates to looms, and it has reference particularly to swivel-loom.

The invention consists in a swivel-loom improved particularly in those portions thereof which comprise the picker-stick-operating mechanism, the swivel-shuttle-rack-bar-actuating mechanism, and the swivel-batten-controlling means.

The invention will be found fully illustrated in the accompanying drawings, wherein—

Figure 1 is a view in front elevation of my improved loom, parts unnecessary to a full illustration of the invention being removed. Fig. 2 is a horizontal plan view taken substantially in the line *xx* in Fig. 1, and Figs. 3 and 4 illustrate details of the invention.

In said drawings, *a* designates the side frames of the loom, the same being bound together by braces *b* in the usual manner and being connected by the usual breast-beam *c*, in which is journaled the cloth-beam *d*.

e designates a rock-shaft on which are mounted the lay-swords *f*, which carry the batten *g*.

h designates the reed, which is fixed in the usual manner on the batten.

i designates the shuttle-box-guiding frames, the same being carried by the batten and its accessory parts, and *j* denotes the shuttle-boxes, the same being carried by the vertical box-rods *k*, which are guided in brackets *l*, carried by the rock-shaft *e* and being adapted to be raised and lowered, through said box-rods and connecting-rods *m*, by levers *n*, the levers being operated from any suitable and well-known mechanism. (Not shown.) In each bracket *l* is fulcrumed one of the picker-

sticks *o*, adapted to throw a fly-shuttle *p* back and forth across the batten *g*.

q is the cam-shaft. This shaft *q* carries cams *r*, against the peripheries of which bear conical rollers *s*, journaled on the turned-off portions or arms *t* of rock-shafts *u*, which are journaled in the side frames and which are provided with other arms *v*, each adapted to receive a loop *w* in the usual strap *x*, which the adjoining picker-stick carries.

y designates a pin mounted on a bracket *z*, projecting from each side frame, said pin being alined with the adjoining arm *v* when the same is in the position shown in Fig. 1 and being adapted to receive the loop of the strap *x* when said strap is permitted to fall by a flexible connection 1, secured to it.

2 designates a plurality of guide-pins which penetrate slots 3 in the laterally-movable structure 4, commonly termed the "swivel-batten." This structure is adapted to be moved on the guide-pins 2 by a mechanism and for reasons hereinafter described. It carries in the usual manner the swivel-shuttles 5, the reciprocating rack-bar 6, wherefrom said shuttles get their motion, and the pinions 7, which connect the racks of said shuttles with said rack-bar.

8 designates a pin which is carried by the rack-bar 6 and which is connected to a crank 9 on a slender vertical shaft 10 by a pitman 11, said shaft 10 being journaled in a bracket 12, which is pivoted to one of the brackets 1. The lower end of this shaft carries another arm 13. The shaft 10 is rigidly connected to the structure 4 by a brace 14, projecting from said structure and loosely penetrated by said shaft.

The above-mentioned pins 2 project from a vertically-movable frame 15, which comprises vertical rods 16, that are guided in brackets 17, projecting from the lay-swords *f*, said frame being normally held in its elevated position by springs 18, coiled about the rods 16. Said frame 15 is connected with a lever 19, which is fulcrumed in a bracket 20, projecting from a portion of the loom-frame, by a link 21.

On the shaft *q* in a position where it may be conveniently shifted into alinement with the lever 19 is keyed a cam 22, the hub 23 of which is provided with a peripheral groove

24. On the same shaft *g* is secured a peripherally-toothed segment 25.

26 denotes an auxiliary frame projecting from one of the braces *b* of the main frame and affording bearings for a short shaft 27, carrying a crank 28. The shaft 27 is adapted to be immediately stopped at the position to which it is turned by a spring-actuated brake 29, which bears against the periphery of a disk 29' on said shaft and which is mounted in said bracket 26. On the shaft 27 is keyed a pinion 30, whose hub 31 is provided with a peripheral groove 32 and which is adapted to be thrown into mesh with the segment 25. In the frame 26 is fulcrumed a lever 33. By means of a spring 34, which connects the upper end of this lever with the bracket at a point on the other side of the fulcrum of said lever relatively to the upper end thereof, said lever is adapted to be firmly held at either of its limits of motion on either side of the perpendicular. Said lever carries a pin 35, which engages the groove 32 in the hub of the pinion 30. In another bracket 36, projecting from the said brace *b*, is fulcrumed another lever 37, having a pin 38, which engages the groove 24 in the hub of the cam 22. The levers 33 and 37 are substantially parallel, and their lower ends are connected by a pitman 39. It being remarked that the pin 35 is below the fulcrum of the lever 33, while the pin 38 is above the fulcrum of the lever 37, it will be seen that upon the shifting of the levers the cam 22 and the pinion 30 will be simultaneously thrown either into or out of alinement with the lever 19 and the segment 25, respectively. The crank 28 carries a wrist-pin 40, to which is connected a pitman 41, which is in turn connected to a bell-crank lever 42, fulcrumed on the front brace *b*. A connecting-rod 43 joins the arm 13 and the bell-crank lever 42.

44 designates arms extending in opposite directions from the lever 33 and having secured to them flexible connections 45.

At one end of the batten *g* is mounted a bracket 46. In this bracket are journaled a gear 47 and a pinion 48, intermeshing. Fulcrumed concentrically with the gear is a lever 49, carrying a pawl 50, engaging the teeth of said gear. The pinion carries a plate 51, which is rendered radially adjustable with reference to the pinion by virtue of set-screws 52 penetrating parallel slots 53 in said plate. The plate is connected with the structure 4 by a rod 54. By adjusting the plate it will be obvious that the effect of the throw of the pinion on the structure may be varied. In the bracket 46 is arranged to reciprocate a spring-actuated longitudinally-movable pawl 55, having a rounded head 56, adapted to engage concave recesses 57 in the periphery of a star-wheel 58. This mechanism simply acts to securely maintain the gear at the points to which it is intermittently turned by the pawl.

59 is a flexible connection secured to the lever 49.

Preliminarily to describing the operation of the loom it should be remarked that the various flexible connections should be connected up with a jacquard or other similar call mechanism, so that at the proper time they will be made to actuate the various parts which they control. The batten being reciprocated in the usual manner and the shaft *g* being rotated, if the fly-shuttle is working the jacquard will be drawing upon the flexible connections 1 and so hold the straps *x* with their loops receiving the arms *v* of the shafts *u*, with the consequence that the cams *r* on the shaft *g* will by rocking the shafts *u* in an obvious manner cause the picker-sticks to be actuated, so as to throw the fly-shuttle back and forth across the batten. Suppose now the swivel-shuttles are to operate. The jacquard first releases the straps *x*, so that they will rest on the pins *y*, the arms *v* being permitted to oscillate now idly. At the same time the jacquard shifts the lever 33, so as to throw the cam 22 into alinement with the lever 19 and the pinion 30 into engagement with the segment 25. Thus with the continued rotation of the shaft *g* said lever and the pinion will be operated, the former first acting to lower the frame 15 and so project the shuttles through the warp and the latter then acting to turn the crank 28 through a half-revolution, so as to shoot the swivel-shuttles through the intermediate mechanism comprised in the rack-bar and pinions, the pitman 11, the shaft 10, and the parts connecting the arm 13 of said shaft with the wrist-pin of the crank 28. When the swivel-shuttles have been shot, the lever 19 will again act to bring the shuttles back through the warp by lifting the frame 15, whereupon the pinion 30 will be made to complete another half-revolution to shoot the shuttles to their original positions. This operation will continue as long as the jacquard, through the mechanism connecting it with the cam 22 and the pinion 30, keeps these parts in engagement with the lever 19 and the segment 25. When it again permits their disengagement, it at once resumes the lifting of the straps *x* into engagement with the arms *v*, so that the picker-sticks renew their actuating of the fly-shuttle.

In the ordinary swivel-loom the parts of the weave worked by each swivel-shuttle are all disposed a constant distance from the edge of the goods. In order that each shuttle may be shifted laterally so as to perform its work at various distances from the edge of the goods, I have provided the mechanism controlled by the flexible connection 59, and which when actuated by the jacquard throws the structure 4 and its accessory parts, including the swivel-shuttles, bodily laterally in one direction or the other to an extent determined by the distance which the jacquard acts to turn the pinion 48 by vibrating the lever 49.

Having thus fully described my invention,

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

1. In a loom, the combination, with the frame, of a picker-stick and an oscillatory arm arranged in said frame, said picker-stick being adapted to be vibrated from said oscillatory arm, a strap connected to the picker-stick and having a loop receiving the free end of said arm, a strap-holding device arranged at one of the limits of motion of said arm, and means for shifting said strap from said arm to the receiving device and vice versa, substantially as described.

2. In a loom, the combination, with the frame, of a rotary shaft journaled in said frame, swivel-shuttles, a supporting structure for said shuttles movable vertically of the warp, operative connecting means between said shaft and the shuttles, operative connecting means between said shaft and said supporting structure, each of said connecting means comprising members disconnective from each other, and a train of levers constituting a common controlling means for said members, substantially as described.

3. In a loom, the combination, with the frame, of a rotary shaft journaled in said frame, swivel-shuttles, a supporting structure for said shuttles movable vertically of the warp, gearing, the members of said gearing being disconnective from each other and one of them being mounted on said shaft, operative connecting means between the other member of said gearing and the shuttles, a cam mounted on said shaft, a lever, said cam and the lever being disconnective from each other, operative connecting means between said lever and said supporting structure, and a train of levers constituting a common controlling means for making and breaking the connection between the members of said gearing and between said cam and lever, substantially as described.

4. In a loom, the combination, with the frame, of a rotary shaft journaled in said frame, swivel-shuttles, a supporting structure for said shuttles movable vertically of the warp, a cam keyed on said shaft, a segment arranged on said shaft, a lever adapted to be engaged by said cam and fulcrumed in said frame, a shiftable pinion adapted to be engaged by said segment, operative connecting means between said lever and the supporting structure, operative connecting means between said pinion and the shuttles, and a train of levers controlling, in common, the cam and the pinion, substantially as described.

5. In a loom, the combination, with the

frame, of a rotary shaft journaled in said frame, swivel-shuttles, a supporting structure for said shuttles movable vertically and laterally of the warp, operative connecting means between said shaft and the shuttles, operative connecting means between said shaft and said supporting structure, each of said connecting means comprising members disconnective from each other, a train of levers constituting a common controlling means for said members, and means for shifting laterally said supporting structure, substantially as described.

6. In a loom, the combination, with the main frame, of swivel-shuttles, a supporting structure for said shuttles movable laterally of the warp, a vertically-movable frame arranged on said main frame and carrying said supporting structure, said supporting structure having a slot-and-pin connection with said movable frame, means for raising and lowering said frame to pass the shuttles vertically through the warp, means for reciprocating the shuttles in said structure, and means for moving said structure and the shuttles carried thereby bodily laterally, substantially as described.

7. In a loom, the combination, with the frame, of swivel-shuttles, a supporting structure for said shuttles movable vertically and also laterally of the warp, means for raising and lowering said structure to pass the shuttles vertically through the warp, means for reciprocating the shuttles in said structure, a flexible rock-shaft controlling said shuttle-reciprocating means and a rigid connection between said rock-shaft and said structure, substantially as described.

8. In a loom, the combination, with the frame, of swivel-shuttles, a supporting structure for said shuttles movable vertically and also laterally of the warp, means for raising and lowering said structure to pass the shuttles vertically through the warp, means for reciprocating the shuttles in said structure, a pinion journaled in said frame, a plate carried by said pinion and adjustable radially thereof, a rod connecting said plate and said structure, and means for rotating said pinion, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of July, 1901.

ROBERT ATHERTON.

Witnesses:

DAVID S. OLDHAM,
FRANK ATHERTON.