

No. 624,039.

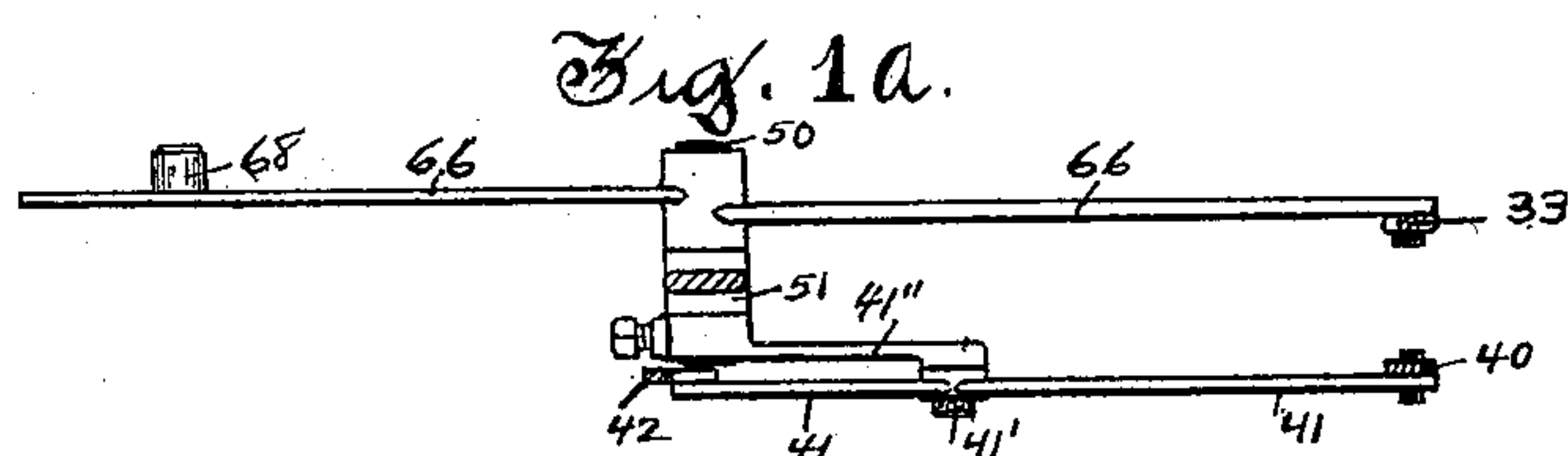
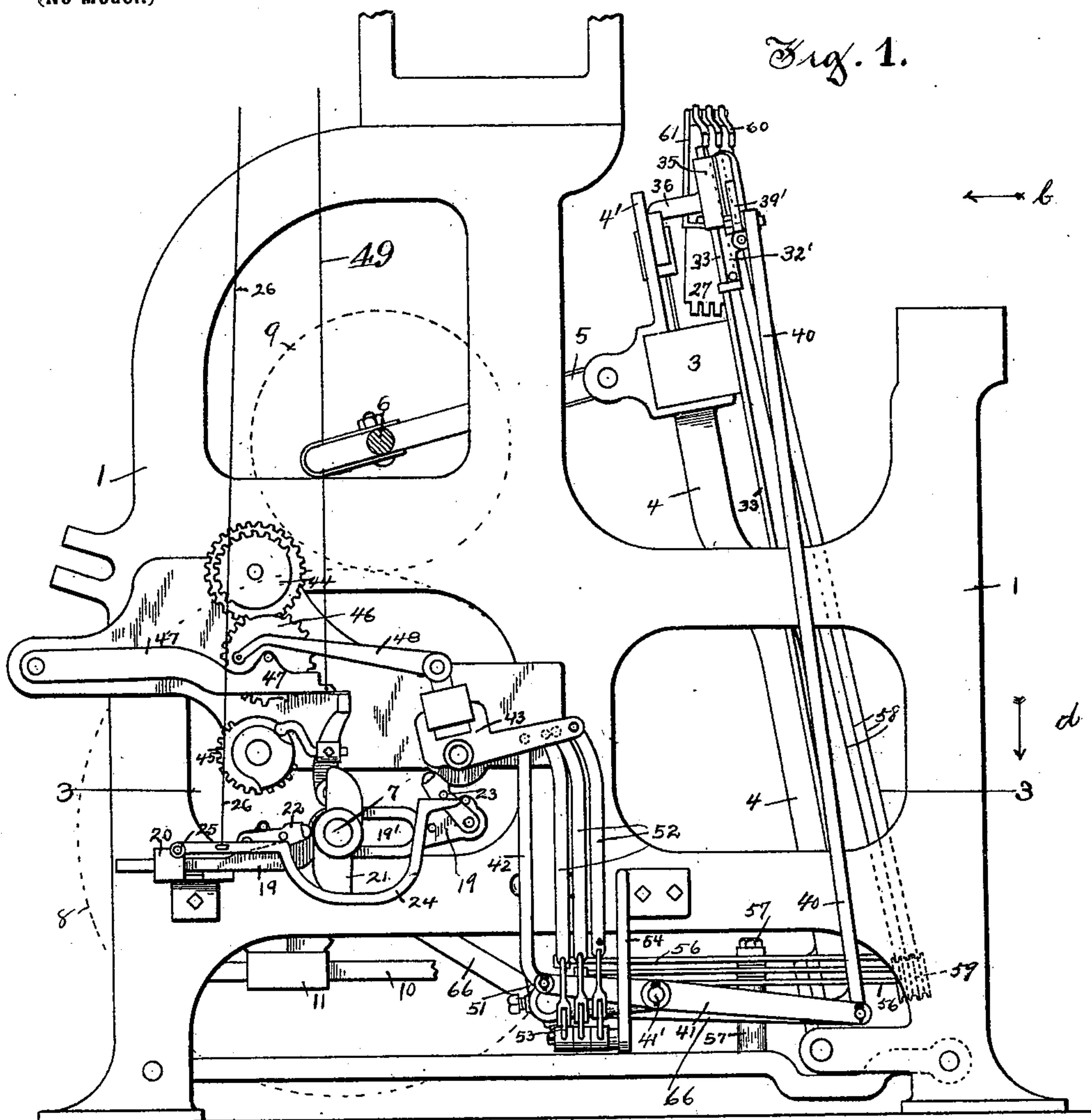
Patented May 2, 1899.

G. F. HUTCHINS.
SWIVEL LOOM.

(Application filed Dec. 1, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
A. Whiting
Arthur J. Cowan.

Inventor
George F. Hutchins
By his Attorney
J. C. Dewey.

No. 624,039.

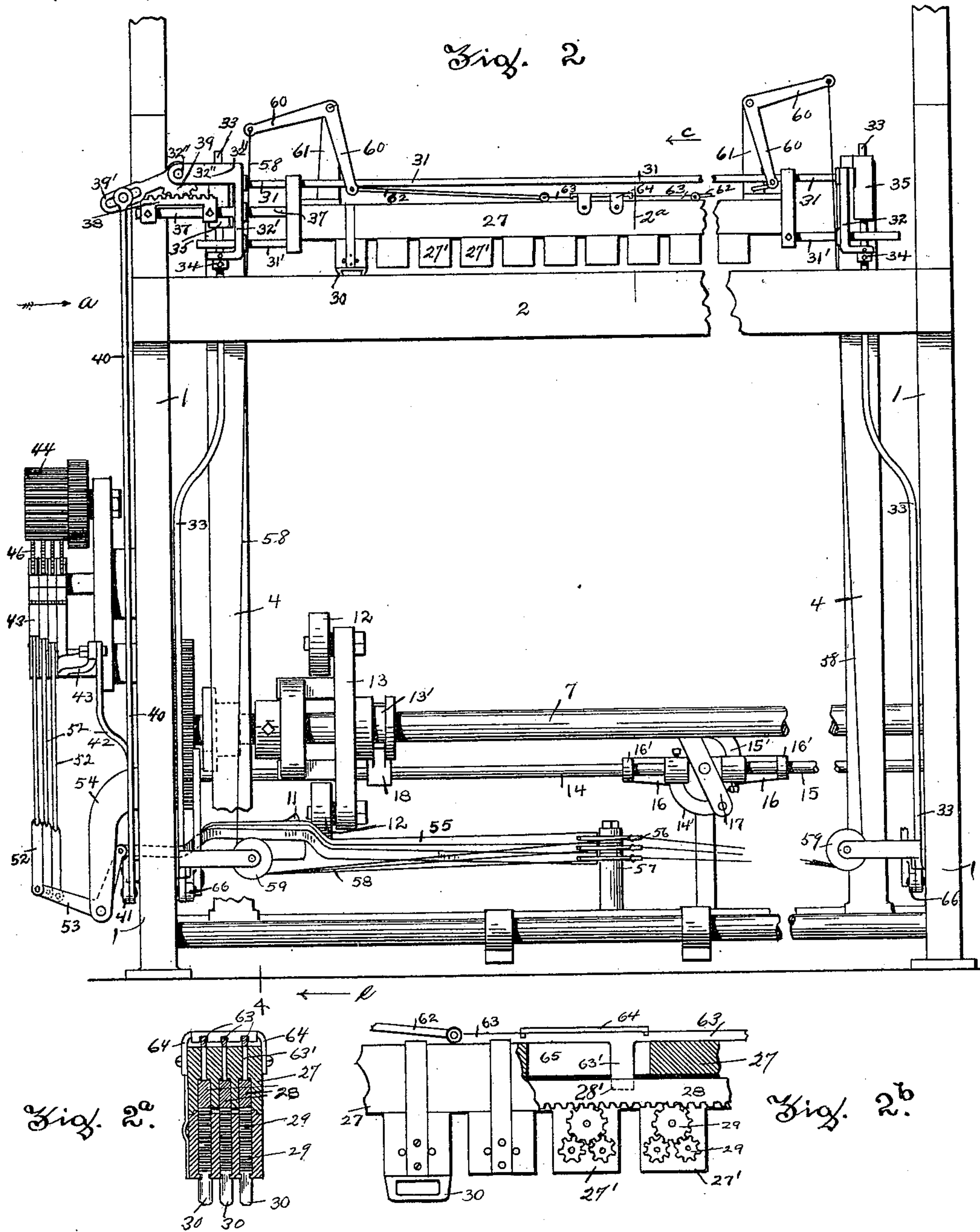
Patented May 2, 1899.

G. F. HUTCHINS.
SWIVEL LOOM.

(Application filed Dec. 1, 1897.)

(No Model.)

3 Sheets—Sheet 2.



Witnesses

Arthur S. Cowan.

Inventor

George F. Hutchins

His Attorney

J. C. Dewey.

No. 624,039.

Patented May 2, 1899.

G. F. HUTCHINS.

SWIVEL LOOM.

(Application filed Dec. 1, 1897.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 3.

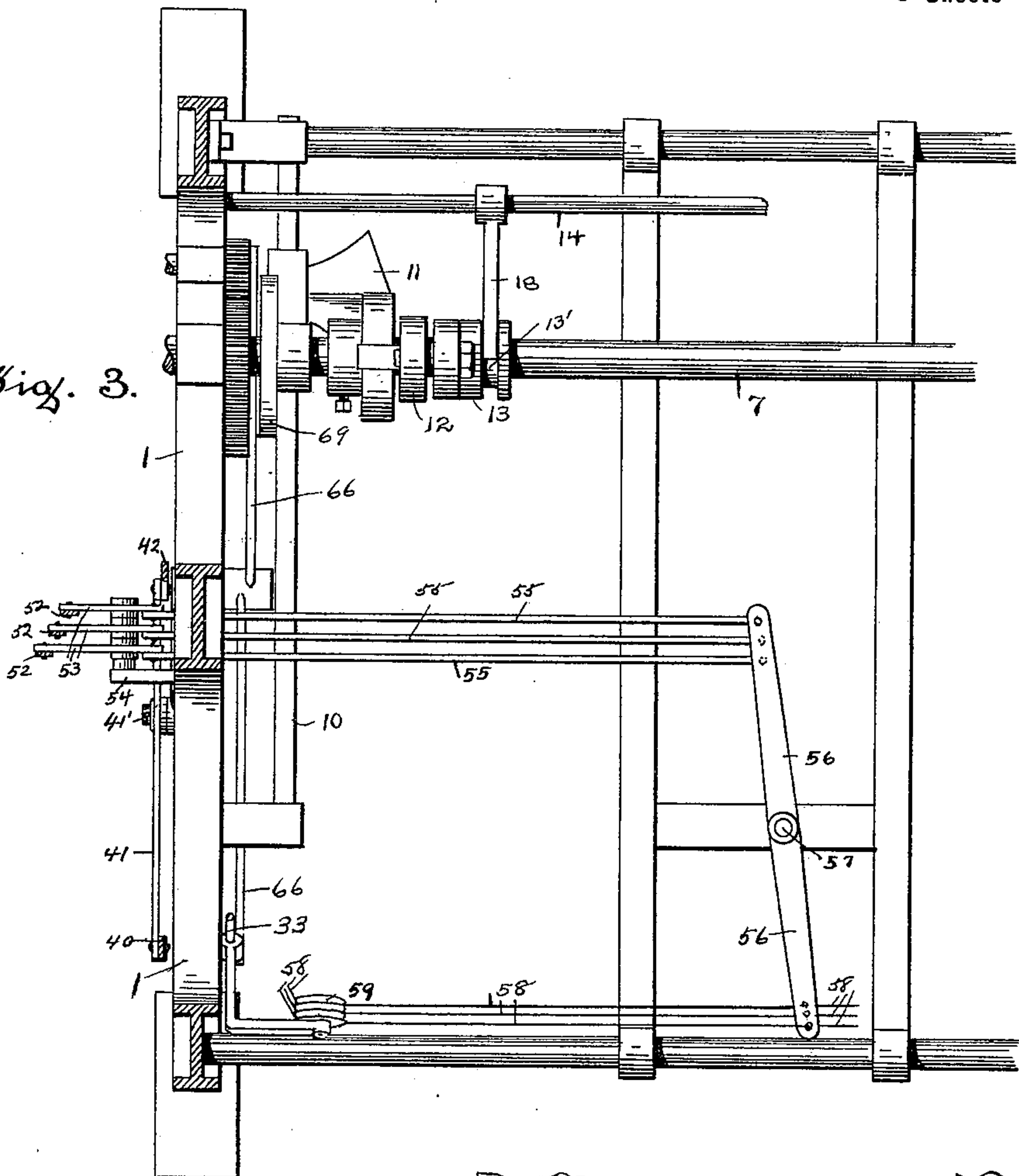
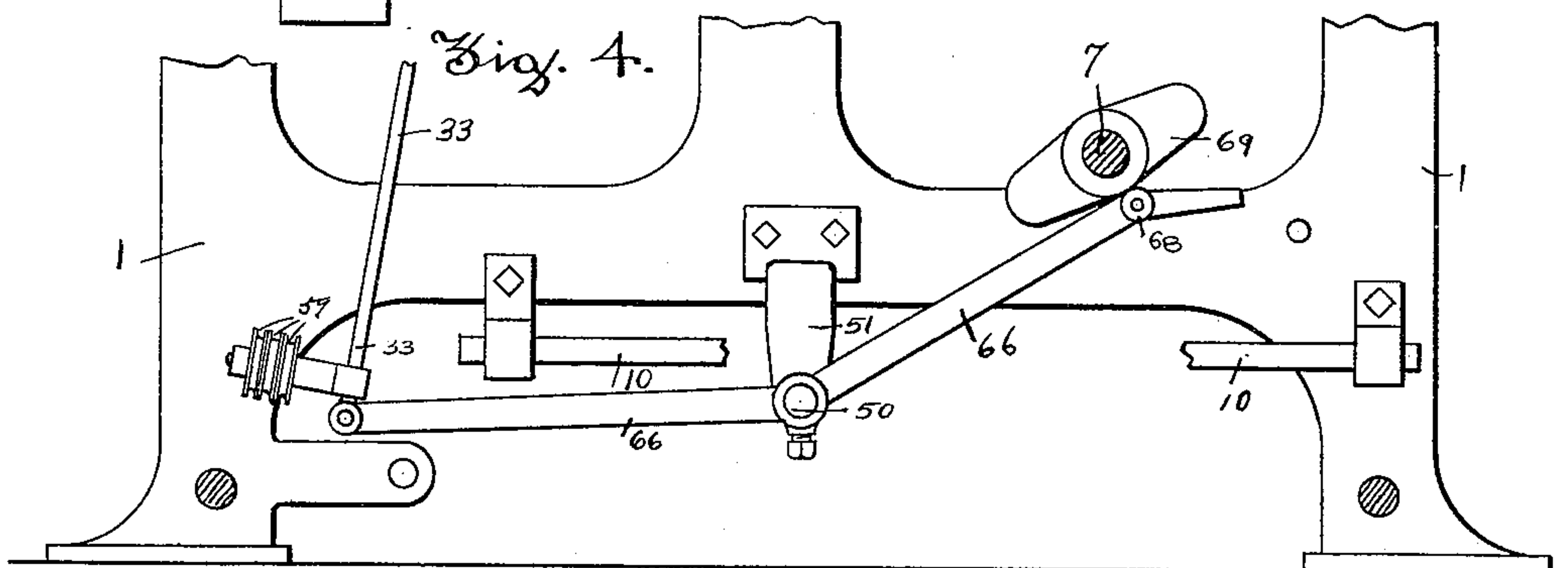


Fig. 4.



Witnesses

A. Whiting
Arthur S. Cowan.

Inventor

George F. Hutchins.

By his Attorney

J. C. Dewey.

UNITED STATES PATENT OFFICE.

GEORGE F. HUTCHINS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO
THE CROMPTON & KNOWLES LOOM WORKS, OF SAME PLACE.

SWIVEL-LOOM.

SPECIFICATION forming part of Letters Patent No. 624,039, dated May 2, 1899.

Application filed December 1, 1897. Serial No. 660,350. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. HUTCHINS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Swivel-Looms, of which the following is a specification.

My invention relates to looms, and more particularly to swivel-loom—that is, to looms in which, in addition to the ordinary fly-shuttle, swivel-shuttles are used for the purpose of making spots or figures on the fabric.

The object of my invention is to provide a swivel-shuttle mechanism having one or more sets of shuttles adapted to be applied to the ordinary form of fly-shuttle loom which will automatically weave spots or figures on the fabric produced on the loom, each spot or figure having one or more colors of weft therein, as desired, and more particularly to improve upon and simplify the swivel-shuttle mechanism shown and described in my United States Letters Patent No. 474,170, of May 3, 1892. In said patented mechanism the swivel-shuttle rail carrying the swivel-shuttles is supported from above, and mechanism of somewhat complicated construction and operation is employed for operating the swivel-shuttle mechanism, the operation of which is controlled entirely by the jacquard. In my present improvements in swivel-shuttle mechanism, to be hereinafter described, I operate the swivel-shuttle rail carrying the swivel-shuttles from below, doing away entirely with the overhead mechanism of said patented loom, and I employ the well-known Knowles harness-shedding or shuttle-box-operating mechanism shown and described in Letters Patent of the United States No. 134,992, of January 21, 1873, for operating the swivel-shuttles.

My invention consists in certain novel features of construction and certain novel combinations of parts of my swivel-shuttle mechanism, as will be hereinafter fully described.

My improvements may be applied to any of the ordinary forms of fly-shuttle looms and may be made to coöperate with the usual operating mechanisms of such looms.

I have shown in the drawings only such portions of a power-loom with my improvements applied thereto as are sufficient to enable those skilled in the art to understand the construction and operation thereof, and I have also shown in the drawings a sliding pick mechanism for controlling the action of the fly-shuttle mechanism of substantially the same construction and operation as are shown in my Patent No. 474,170, of May 3, 1892, above referred to.

Referring to the drawings, Figure 1 is a side elevation of a portion of a loom embodying my improvements looking in the direction of arrow *a*, Fig. 2. Fig. 1^a is a detached plan view of the lever for moving the shuttle-rail horizontally and of the lever for moving it vertically, shown in Fig. 1. Fig. 2 is a front elevation of a portion of a loom embodying my improvements looking in the direction of arrow *b*, Fig. 1. Fig. 2^a is an enlarged sectional view of the swivel-shuttle rail, taken at the line 2^a, Fig. 2, looking in the direction of arrow *c*, same figure. Fig. 2^b is an enlarged front view of the central portion of the swivel-shuttle rail shown in Fig. 2, with a portion of the rail broken away. Fig. 3 is a horizontal sectional view taken at line 3 3, Fig. 1, looking in the direction of arrow *d*, same figure; and Fig. 4 is a vertical section through the lower part of the loom, taken at the line 4, Fig. 2, looking in the direction of arrow *e*, same figure, to show the operating-lever for moving the shuttle-rail vertically and its cam. The other parts are not shown.

In the accompanying drawings, 1 are the loom sides or frames; 2, the breast-beam; 3, the lay; 4, the lay-swords pivotally supported at their lower ends and having the upwardly-extending lay-sword horns 4'.

5 is the crank-connector, which connects the lay 3 with the crank-shaft 6.

7 is the bottom or driven shaft, which is geared to the crank-shaft 5 through gears 8 and 9, as shown by broken lines in Fig. 1.

10 is the picking-shaft, which extends at right angles to the bottom shaft 7 and carries the picking-shoe 11, which is operated on by the rolls 12, carried by the arms or castings 13 on the bottom shaft 7.

All of the above parts may be of the ordinary construction and operation.

The sliding pick mechanism shown in the drawings for controlling the action of the fly-shuttle-operating mechanism is of well-known construction and operation and is fully shown and described in my said Patents Nos. 474,170 and 614,390. It is therefore only necessary to briefly describe the same herein.

10 The two sliding rods 14 and 15 are supported and slide at their inner ends in the oppositely-extending arms 16' of the supporting-stand 16 (see Fig. 2) and are connected by curved arms 14' and 15' to the centrally-pivoted lever 17, so that said rods are caused to move simultaneously in opposite directions. The outer ends of said rods are supported in the loom side. Each rod 14 and 15 has a forked arm or hook 18 fast thereon, (only one is shown in the drawings, Fig. 2,) which engages with the grooved hub 13' of the arm or casting 13, carrying the picking-rolls 12. The arm or casting 13 is mounted to slide on the bottom shaft 7 and also to revolve therewith and to be moved into or out of engagement with the picking-shoe 11, according to the movement of the sliding rods 14 and 15, all in the ordinary way.

The movement of the sliding rods 14 and 15 is controlled from the jacquard (not shown) through intervening mechanism, as follows:

19 is a longitudinal sliding arm or lever supported and sliding at its outer end in a box or stand 20, bolted to the loom side, (see Fig. 1,) and supported at its inner end on the bottom shaft 7, which extends through a longitudinal slot or opening 19' in said lever, which is on the outside of the loom. The bottom shaft 7 has a double cam 21 fast thereon, which as the shaft revolves is brought into engagement with a finger 22, pivoted on the outer end of said sliding lever in the path of said cam, or with a finger 23, pivoted upon the sliding lever 19 on the opposite side of the shaft 7 and in the path of the cam 21, to move the sliding lever 19 in one direction or the other, according as the indicator-lever 24, pivoted at one end at 25, is raised or lowered by the cord 26, leading to the jacquard mechanism. (Not shown. See Fig. 1.) The longitudinal sliding motion of the lever 19 communicates through intervening mechanism (not shown in the drawings and forming no part of my present improvements) a sliding motion to the sliding rods 14 and 15 to move the picking-rolls 12 out of engagement with the picking-shoe 11 to stop the action of the fly-shuttle mechanism or into engagement with the picking-shoe to operate the fly-shuttle mechanism, according to the indications of the jacquard.

I will now proceed to describe the swivel-shuttle mechanism and the operating mechanism therefor, (shown in the drawings,) which form the principal part of my present improvements in swivel-shuttle looms.

As stated above, the harness-shedding mech-

anism or the shuttle-box-operating mechanism of the well-known Knowles loom above referred to is employed for giving longitudinal motion to the swivel-shuttle rail and to the swivel-shuttles independently of any movement of the shuttle-boxes, according to the indications of the jacquard, the cords leading to which are connected with the vibrator-levers of said shedding or box-operating mechanism.

The swivel-shuttle rail 27 may be of substantially the same construction as the swivel-shuttle rail shown and described in my Patent No. 474,170, above referred to. It carries in this instance three sets of longitudinally-moving racks 28 for communicating motion through sets of pinions 29, supported in downwardly-extending blocks or pieces 27', to three sets of swivel-shuttles 30. (See Figs. 2^a and 2^b.)

The above parts may be of the ordinary and well-known construction.

The swivel-shuttle rail 27 has at each end two guide-rods 31 31', extending out therefrom. The upper guide-rod 31 extends the full length of the rail. (See Fig. 2.) The guide-rods 31 31' are supported and have a sliding motion in castings 32 32', located at each end of the swivel-rail. Each casting 32 and 32' is supported on an upright and vertically-moving rod 33, in this instance by an adjustable collar 34. A sleeve or collar 35, secured on the front end of an arm 36, secured to the lay-sword 4', (see Fig. 1,) acts as a guide for the upper ends of the upright rods 33. A rod 37 extends out from one end of the swivel-rail 27 and is secured thereto at its inner end, and at its outer end has secured thereon a rack-bar 38, with which meshes a rack-segment 39, pivotally supported on the arm 32'' of the casting 32'. (See Fig. 2.) The rack-segment 39 has the outwardly-extending arm 39', having a longitudinal slot in its end, to which is pivotally connected the upper end of a vertically-moving rod or connector 40. The lower end of said rod 40 is pivotally attached to one end of a lever 41, which is pivotally supported between its ends on a stud 41' in the end of the arm 41'', fast on the shaft 50, mounted in the lower end of the bracket 51. (See Figs. 1^a and 4.) The other end of the lever 41 is connected by a link or connector 42 with the angle-lever 43 of the shedding or box-operating mechanism of ordinary construction and operation, consisting of the upper and lower partial gears 44 and 45 and vibrator-gear 46, carried on the vibrator-lever 47 and connected by the connecting-arm 48 to the lever 43. A cord 49 in this instance leads from the vibrator-lever 47 to the jacquard mechanism (not shown) to raise or lower the vibrator-lever carrying the vibrator-gear and control the movement of the lever 43.

Motion is communicated to the partial gears 44 and 45 in the ordinary way by a train of gears. (Not shown.)

Through lever 43, connector 42, lever 41, upright rod or connector 40, rack-segment 39,

and rack-bar 38 longitudinal motion is communicated to the swivel-rail at the proper time.

In addition to the longitudinal motion of the swivel-shuttle rail each set of shuttles has an independent longitudinal motion from one block 27' to an adjoining block and back through the system of pinions 29 and sliding racks 28. Each rack 28 is operated independently from the shedding or box-operating mechanism, above described, through a link or connector 52, attached to one of the several angle-levers 43 and to one of the several angle-levers 53, pivoted on a stand 54, attached to the loom side, (see Figs. 1 and 2,) and a rod or connector 55, attached at its inner end to one of several centrally-pivoted levers 56, mounted to swing in a horizontal plane on a stud 57. (See Figs. 1, 2, and 3.) To the opposite end of each lever 56 is secured a cord 58, passing over a pulley 59 and extending up and attached to the outer end of an angle-lever 60, which is pivotally supported on a stand 61, secured upon the top of the swivel-rail 27. (See Fig. 1.) The opposite end of the angle-lever 60 is connected by a link 62 with the sliding plate 63, which is guided and held in position upon the upper side of the swivel-shuttle rail 27 by guides 64 and has a downwardly-extending projection 63', which extends through a longitudinal slot 65 in the upper part of the swivel-rail and into an opening 28' in the upper side of the rack 28. (See Fig. 2^b.)

It will be understood that the connections intermediate the end of the lever 56 and the swivel-shuttle racks are in duplicate, one set at each end of the loom.

By means of the above mechanisms motion is communicated to each set of swivel-shuttles independently from the vibrator-gears 46 of the shedding or shuttle-box-operating mechanism through the intervening connections. It will be understood that there is one vibrator-gear 46 and intervening connections for each set of swivel-shuttles, so that each set can be operated independently of the other, according to the movements of the shedding or shuttle-box-operating mechanism, regulated by the jacquard or other pattern-surface. An up-and-down motion is communicated to the swivel-shuttle rails and the swivel-shuttles carried thereon to raise the same above the race of the lay and allow the movement of the fly-shuttles and lower the same to carry the swivel-shuttles into the shed by the two vertical upright rods 33, above referred to. The lower end of each rod 33 is pivotally attached to the front end of an arm or lever 66, fast on a rock-shaft 50, which extends across the loom and is supported at each end in the lower end of a bracket 51. (See Fig. 4.) One of the arms or levers 66 has a rearwardly-extending portion or arm, which carries a roll 68, to be engaged by a cam 69 on the bottom shaft 7, as shown in Fig. 4. The revolution of the cam 69 through roll 68

depresses the rear end of the arm or lever 66 and rocks the shaft 50 and raises the arms or levers 66, fast on said shaft, and through rods 33 positively raises the swivel-shuttle rail and the swivel-shuttles carried thereon. The weight of the swivel-shuttle mechanism tends to keep the roll 68 in engagement with the cam 69 on the bottom shaft 7, so that in the continued revolution of the cam 69 the low part of said cam will allow the swivel-shuttle rail to be lowered by its own weight. It will be seen that with the double cam 69 at each revolution of the bottom shaft (which makes one revolution to two revolutions of the crank-shaft) the swivel-shutter rail and the swivel-shuttles may be raised and lowered twice consecutively—that is, the swivel-shuttles may be used to make two consecutive picks and put in two colors between two filling-threads put in by the fly-shuttle. While the swivel-shuttle mechanism is in operation, it will of course be understood that the fly-shuttle mechanism is thrown out of operation by the sliding pick mechanism above described, and when the fly-shuttle mechanism is in operation the lever 66 is held or locked down at the end which is engaged by the cam 69 in the manner fully shown and described in my United States Letters Patent No. 614,390, of November 15, 1898, to which reference is made, to hold the lever 66 out of engagement with the cam 69 as long as the fly-shuttle mechanism is in operation and the swivel-shuttle mechanism is in its raised position above the shuttle-race. As soon as the fly-shuttle mechanism is out of operation the locking mechanism releases the lever 66 and allows the same to come in engagement with and be operated by the cam 69.

From the above description, in connection with the drawings, the operation of my improvements in swivel-loom, and particularly the combining of the ordinary and well-known Knowles harness-shedding or shuttle-box-operating mechanism with swivel-shuttle mechanism, the operation of which is controlled by said shedding or box mechanism independently of the drop-shuttle boxes or any movement thereof, will be readily understood by those skilled in the art.

When the swivel-shuttles are to operate, the sliding pick mechanism is automatically operated, as fully described in my Patent No. 614,390, above referred to, and the fly-shuttle mechanism thrown out of operation. The swivel-shuttle rail carrying the swivel-shuttles may now be lowered into and raised out of the shed for two consecutive beats of the lay through the double cam 69, levers 66, and vertical connector-rods 33, (it will be understood that there is a lever 66 and rod 33 at each end of the loom,) and then the fly-shuttle operated, and so on. Each set of swivel-shuttles is operated to weave their threads onto the fabric, according to the indications of the jacquard or any other pattern mechanism operating through the harness-shedding or

shuttle-box-operating mechanism to communicate motion to the swivel-shuttles, first in one direction and then in the other.

It will be understood that the details of construction of my improvements may be varied, if desired. Instead of a double cam 69 a single cam may be used; but with the double cam 69 two consecutive threads of different color may be woven on the fabric by two sets of swivel-shuttles between the ordinary filling-threads put in by the fly-shuttle.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a loom, the combination with operating mechanism, comprising upper and lower partial gears, vibrator-levers adapted to be operated by a jacquard or other pattern surface, and vibrator-gears carried on said vibrator-levers, of the swivel-shuttles, operating-pinions, and sliding racks, carried on the swivel-shuttle rail and said swivel-shuttle rail and means for supporting said rail, and connections intermediate said racks and said vibrator-gears, to communicate a reciprocating longitudinal motion to said racks, substantially as shown and described.

2. In a loom, the combination with operating mechanism, comprising upper and lower partial gears, the vibrator-levers adapted to be operated by a jacquard or other pattern surface, and vibrator-gears carried on said vibrator-levers, of the swivel-shuttle rail, and means for supporting said rail, and swivel-shuttles, operating-pinions, and sliding racks carried on said swivel-shuttle rail, and connections intermediate said rail and one of said vibra-

tor-gears, to communicate a longitudinal motion to said rail, and connections intermediate said sliding racks and the other vibrator-gears, to communicate a longitudinal motion to said swivel-shuttles, substantially as shown and described.

3. In a loom, the combination with operating mechanism, comprising upper and lower partial gears, a vibrator-lever adapted to be operated by a jacquard or other pattern surface, and a vibrator-gear carried on said vibrator-lever, of the swivel-shuttle rail, and connections intermediate said rail and said vibrator-gear, to communicate a longitudinal motion to said swivel-shuttle rail, and means for communicating an up-and-down motion to said rail, comprising vertically-moving rods connected at their upper ends with said rail, and at their lower ends with levers, and said levers operated by a double cam, to raise and lower the swivel-shuttle rail and said double cam, substantially as shown and described.

4. In a loom, the combination with a swivel-shuttle rail carrying swivel-shuttles, of vertically-moving rods connected at their upper ends with said rail, levers at the lower ends of said rods, and a cam to operate said levers, to communicate a positive upward motion to the swivel-shuttle rail, to carry the swivel-shuttles out of the shed, substantially as shown and described.

GEORGE F. HUTCHINS.

Witnesses:

M. J. GALVIN,
J. C. DEWEY.