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PATTERN REVERSING MECHANISM FOR LOOMS.

No. 490,890.

Patented Jan. 31, 1893.

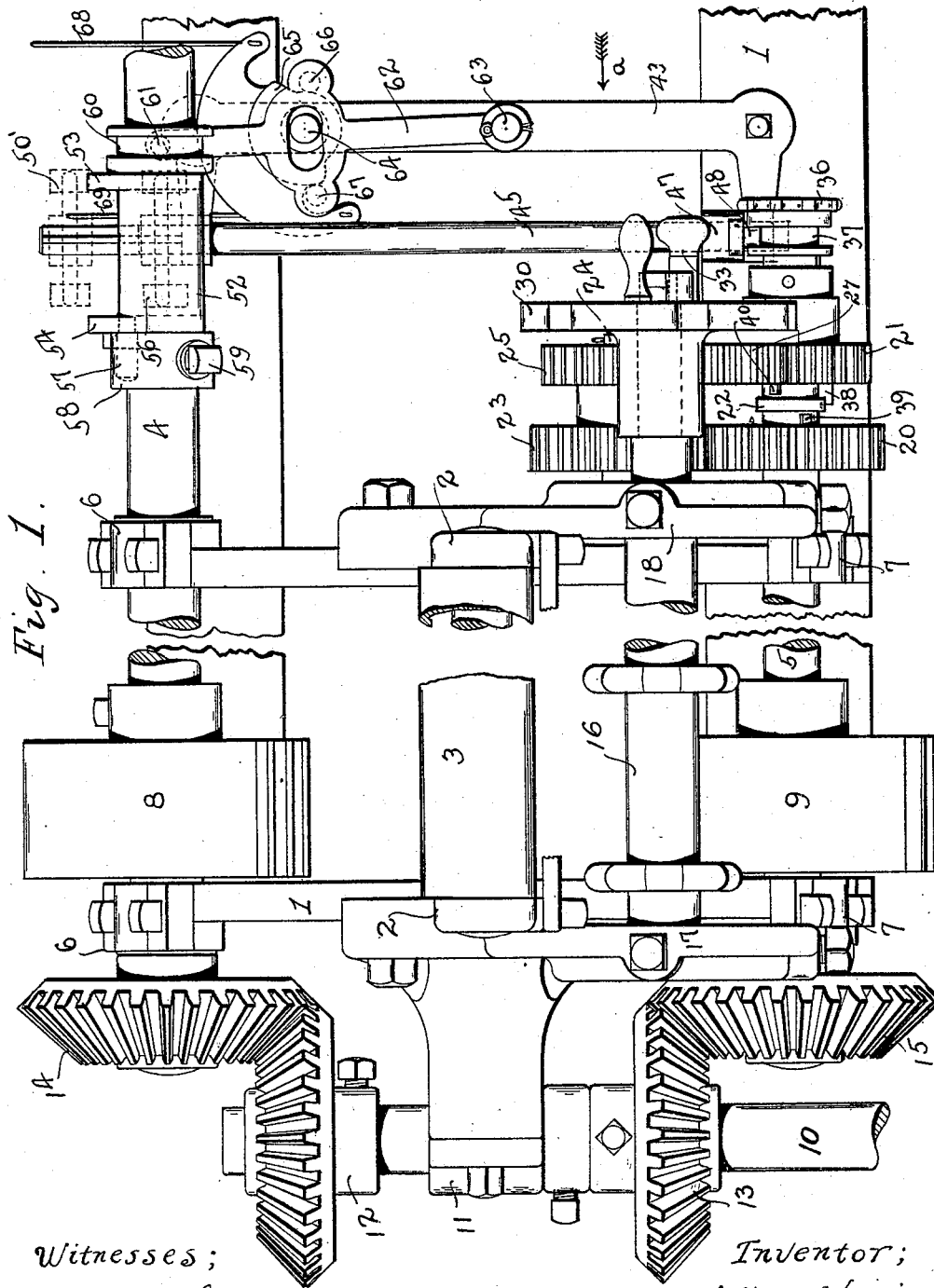


Fig. 1.

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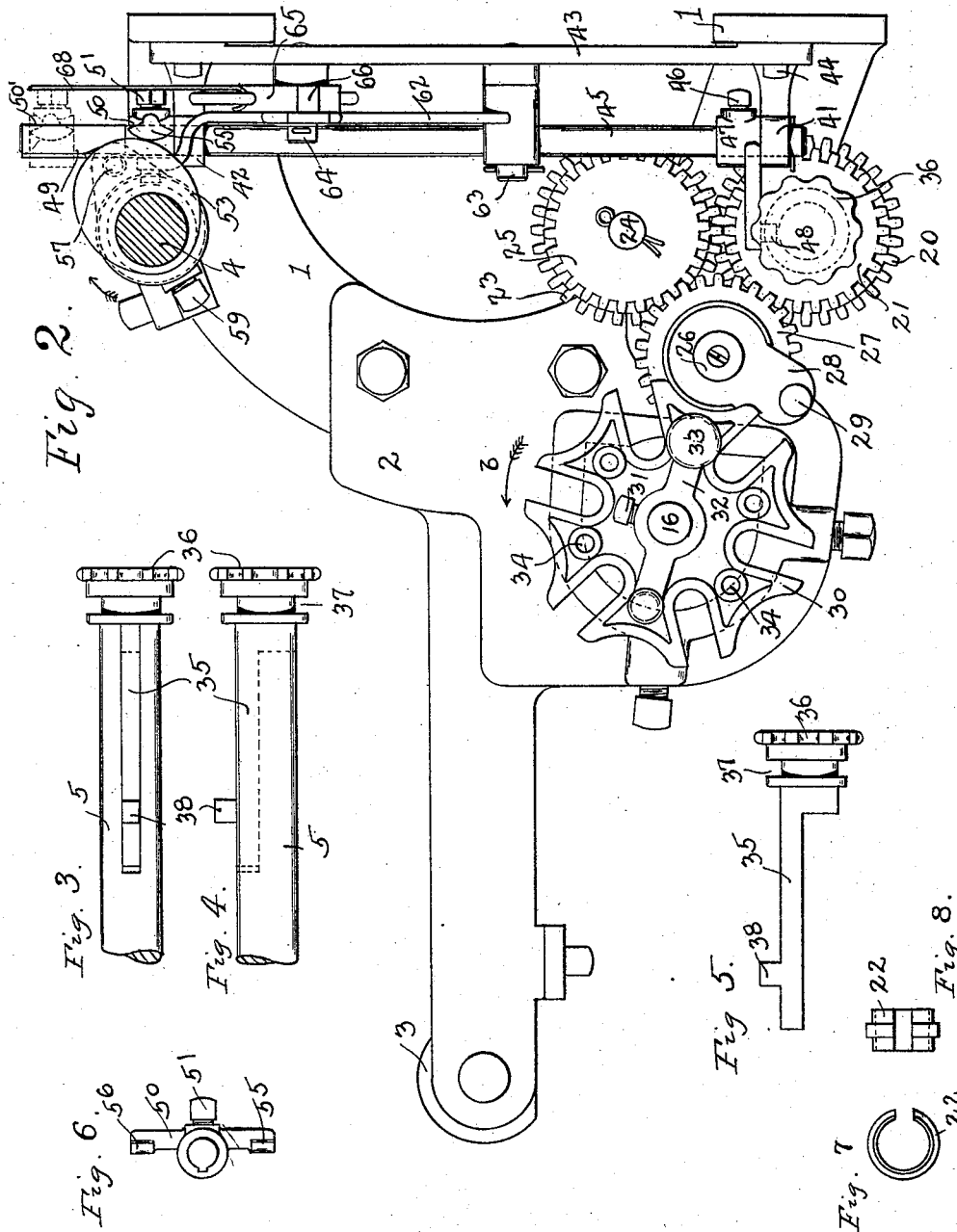
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UNITED STATES PATENT OFFICE.

WILLIAM WATTIE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE
KNOWLES LOOM WORKS, OF SAME PLACE.

PATTERN-REVERSING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 490,890, dated January 31, 1893.

Application filed June 23, 1892. Serial No. 437,795. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WATTIE, 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 Pattern-Reversing Mechanism for Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the
10 drawings making a part of this specification, will enable others skilled in the art to which my invention belongs to make and use the same.

My invention relates to looms, and more particularly to the pattern chain mechanism for controlling the movement of the shuttle boxes in looms.

The object of my invention is to repeat the indications of certain bars in the pattern chain an indefinite number of times, by building two contiguous similar bars. This result is accomplished by alternately reversing the motion of the pattern chain on each pick, for as many successive picks as it is desired to repeat a certain bar of the chain. The indications for reversing the pattern chain are supplied from the Jacquard machine, or from an auxiliary pattern chain, moving every pick.

My invention consists in certain novel features of construction and operation of a supplemental mechanism combined with the ordinary pattern chain mechanism for controlling the movements of shuttle boxes in looms, to operate automatically, and alternately reverse
35 the motion of the pattern chain on each pick, and for as many successive picks as it is desired to repeat a certain bar of the chain, as will be hereinafter fully described.

I have shown in the drawings my invention applied to the head motion of the well known Knowles loom, as fully shown and described in Reissued Letters Patent of the United States, No. 7,784, dated July 3, 1877.

Referring to the drawings:—Figure 1 is a front elevation of a sufficient portion of the head motion of the Knowles loom referred to, to show the application of my invention applied thereto. Fig. 2 is a side elevation of the part shown in Fig. 1, looking in the direction of arrow *a*, same figure, with some of the

parts omitted for the sake of clearness. Figs. 3, 4, 5, 6, 7, and 8 are details of the reversing mechanism to be hereinafter fully described.

In the accompany drawings the following parts are ordinarily used in the construction of a Knowles loom, and are as follows:—

1 is the head frame, 2 the head arms, 3 the vibrator heel shell, 4 the top cylinder shaft, and 5 the bottom cylinder shaft, mounted to run freely in the journals 6 and 7 in the head frame, and upon which are fast the box motion cylinder gears 8 and 9, which work upon the vibrator gears, not shown, of the Knowles loom, to operate the shuttle boxes, all as fully shown and described in said patent before
65 referred to.

The cylinder shafts 4 and 5 are driven in the usual way from the main shaft of the loom, through the upright shaft 10, journaled at the top in the back head arm 11, see Fig. 1, and beveled gears 12 and 13 fast on said shaft which mesh with beveled gears 14 and 15 fast on the cylinder shafts 4 and 5.

The pattern chain cylinder shaft 16, is mounted in journals 17 and 18, in the head arms 2.

The mechanism for driving the pattern cylinder from the bottom cylinder shaft is somewhat similar to the mechanism shown and described in the United States Patent, No. 398,328, dated February 19, 1889, and is as follows:—The spur gear 20 is loose upon the cylinder shaft 5, and is separated from the spur gear 21, also loose upon the shaft 5, by the loose collar 22, shown in details in Figs. 7 and 8. The spur gear 20 meshes with spur gear 23, loose upon the stud 24 in the head frame. The spur gear 25 is fast upon the hub of the spur gear 23, and in line with gear 21. The gears 20 and 23 are of the same size, and large enough, so that the teeth of the gears 21 and 25 which are also equal in size, will clear each other when the gears 20 and 23 are properly meshed. (See Fig. 2.) Loose upon a stud 26 in the head frame, is a spur gear 27, see Fig. 2, equal in size to gears 21 and 25, and meshing with them; the gear 27 carries fast upon its face, the pin-wheel arm 28, the pin 29 of which engages with and operates the star wheel 30, loose upon the end of the

pattern chain cylinder shaft 16. Fastened by a set screw 31, on the end of the pattern chain shaft 16, is a snap handle arm 32, in one end of which, 33, is a spring plunger constructed in the same manner as that described in said patent, No. 398,328, and which is adapted to enter the sockets 34, spaced evenly between the points of the star wheel 30. The angle through which the star wheel 30 is revolved, by one action of the pin wheel 28, and the angle between the sockets 34 on the star wheel 30, are each equal to the angle between the pattern chain bars on the pattern chain cylinder.

Fitted to slide freely in the spline in the bottom cylinder shaft 5, see Figs. 3 and 4, is a driving key 35, shown in detail in Fig. 5; the key 35 is provided with a head 36, in which is a circumferential groove 37, and is also provided with a projection 38; the projection 38 on the key 35 is adapted to engage pin 39, fixed in the face of gear 20, or pin 40 in gear 21, (see Fig. 1,) according as the key 35 is pushed in or pulled out to the extremities of its motion. When the key 35 is pushed into engagement with pin 39 in gear 20, the pattern chain is driven in one direction through the gears 23, 25, and 27, and the pin wheel 28 and star wheel 30. When the key 35 is pulled out to engage pin 40 in gear 21, the pattern chain is driven in the opposite direction, through gears 21 and 27, and pin wheel 28, and star wheel 30.

In the United States Patent No. 398,328, above referred to, the reversal of the direction of motion of the pattern chain is effected by changing the position of the driving key by hand, for purposes fully set forth in said patent.

In the present invention the reversal of the direction of motion of the pattern chain is effected automatically, by indications from the Jacquard machine, or from an independent single row indicator chain, by my supplemental mechanism combined with the driving key, in the manner now to be described.

Fitted freely in bearings 41 and 42, see Fig. 2, on stand 43, fastened by screws 44, to the head frame 1, is a rock shaft 45, on the lower end of which is fastened by a set screw 46, an arm 47, which rests on bearing 41, and carries at its outer end a pin 48, which extends loosely into the groove 37 in the head 36 of the driving key 35. Fitted to slide on a feather 49, set in the top end of shaft 45, is a double arm 50, see Fig. 2, shown also in detail in Fig. 6, which arm can be fastened at any desired height on the end of shaft 45, by set screw 51. Fitted to slide on the top cylinder shaft 4, is a sleeve 52, provided at each end with the cam 53 and 54, the distance between which is such, that when one of the cams, as 53, is in line to engage the face 55 of the double arm 50, the other cam 54 will clear the face 56 of the arm 50, and vice versa. (See dotted lines, Fig. 1.) The sleeve 52, though free to slide on shaft 4, is rotated with the

shaft by means of a pin 57, fast in the side of cam 54, which pin is fitted to slide in a hole in the driver 58, which is fastened to the shaft 4 by a set screw 59. The end of sleeve 52, opposite the driver 58 is provided with a circumferential groove 60, which receives freely a pin 61 fast in the top end of cam lever 62, which lever is pivoted on a stud 63 on stand 43. Pivoted on a stud 64, also fast in stand 43, is a double cam 65, which works upon pins 66 and 67 fast in lever 62. The cam 65, lever 62, and positions of pins 66, 67 and 61, are so proportioned, that the movement of lever 62, occasioned by the action of cam 65 on the pins 66 and 67, is such as to slide the sleeve 52, from the position shown in Fig. 1, and bring the cam 54 in line with the face 56 of double arm 50, or working in the opposite direction to return the sleeve 52 from the last mentioned position to the position shown in Fig. 1. The cam 65 is worked by means of connectors 68, 69, Figs. 1 and 2, and connections to the Jacquard machine or the connectors 68, 69, may be worked by an independent pattern chain supplied for the purpose, and working every pick in any well known manner.

It is necessary, in order to prevent cramping and consequent breakage of the parts, that the sliding of reverse key 35 should be done while the pin wheel 28 is not in action with its star wheel 30. It happens that when the loom and Jacquard mechanisms are properly timed to each other, that the lift of the jacquard occurs while the pin wheel is in action with the star wheel. I therefore indicate cams 53 and 54 from the jacquard, and these cams are so timed on shaft 4, as to slide reverse key 35 during that part of the pick in which the pin wheel is clear of the star wheel.

The parts being in the position shown in Figs. 1 and 2, in which cam 53 has acted on face 55, and through shaft 45, and arm 47, pulled out key 35, the pattern chain shaft will continue to turn in the direction of the arrow b, Fig. 2, until the Jacquard lifts on connector 69, throwing cam 65 and lever 62, to the right in Fig. 1, when cam 54 acting on face 56 of arm 50, pushes in the key 35 through the intervening mechanism, and drives the pattern chain shaft through gears 20, 23, and 25 in the opposite direction to arrow b, Fig. 2, which will be continued until the jacquard lifts on connector 68, when the revolution of the pattern shaft will be reversed, as above described.

If the jacquard lifts every pick alternately, on connector 68 and 69, the pattern chain will be reversed every pick, and will oscillate between two contiguous bars of the chain, thereby repeating the same indications as many times as may be desired by properly punching the cards of the Jacquard machine, or building the independent indicator chain.

The bar 50 may be pushed up on its feather 49, on the end of shaft 45, to the position indicated by dotted lines 50', Figs. 1 and 2, clear of the cams 53 and 54 on the sleeve 52,

when the mechanism for automatically operating the driving key 35 will be rendered inoperative, without disturbing the connections to the Jacquard mechanism.

5 The snap handle construction, with the plunger 33 working in sockets 34, allows the plunger 33 to be withdrawn and the chain shaft 16 turned by hand, independently of the star and pin wheel mechanism, and gearing, in the
10 ordinary way.

It will be understood, that the details of construction of some of the parts of my mechanism above described, may be varied somewhat from what is shown and described if desired.
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Having thus described my invention, what I claim as new, and desire to secure by Letters Patent is:—

20 1. In a loom, the combination with mechanism for reversing the motion of the pattern chain, consisting of a system of gears, and a driving key movable longitudinally in the lower cylinder shaft and revolving therewith, and said shaft, of a supplemental mechanism
25 for automatically operating said key to reverse the motion of the pattern chain, as desired, said mechanism consisting of a rock shaft provided with an arm to engage the driving key, and with a double arm provided
30 with faces to be engaged by the cam surfaces on a sleeve mounted on the top cylinder shaft, and said shaft, and said sleeve provided with cam surfaces, and adapted to revolve with said cylinder shaft, and to slide thereon, and
35 mechanism for sliding the sleeve on said shaft, said mechanism operated by cords or connections to the pattern mechanism, substantially as set forth.

40 2. In a loom, the combination with the pattern chain cylinder shaft, star wheel, pin wheel, reverse gears, and sliding driving key

of the reverse mechanism, of means for automatically sliding the key to reverse the motion of the pattern chain, consisting of an arm engaging said key, a rock shaft carrying
45 said arm, and also a double cam arm, and a sleeve mounted on the top cylinder shaft, and said cylinder shaft, and the sleeve adapted to revolve with said shaft and slide thereon, and provided with cam surfaces to engage the
50 double cam arm, and a lever for sliding said sleeve, and a cam lever for operating said lever, said cam lever operated by cords or connectors to the pattern mechanism, substantially as set forth.
55

3. In a loom, the combination with mechanism for reversing the motion of the pattern chain, consisting of a system of gears, and a driving key movable longitudinally in the lower cylinder shaft and revolving with said
60 shaft, and said shaft, of a supplemental mechanism for automatically sliding said key to reverse the motion of the pattern chain, said mechanism consisting of a rock shaft provided with an arm for engaging the driving
65 reverse key, and with a double arm at its upper end to be acted on by the cam surfaces on a sleeve, said double arm adapted to slide on said rock shaft, and be moved out of engagement with the cam surfaces on said sleeve
70 for the purpose stated and said sleeve provided with cam surfaces and mounted on the top cylinder shaft, and said shaft, and the sleeve adapted to revolve with said shaft and slide thereon, the sliding motion of said
75 sleeve controlled by cords or connectors to the pattern mechanism, through intervening mechanism, substantially as set forth.

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