

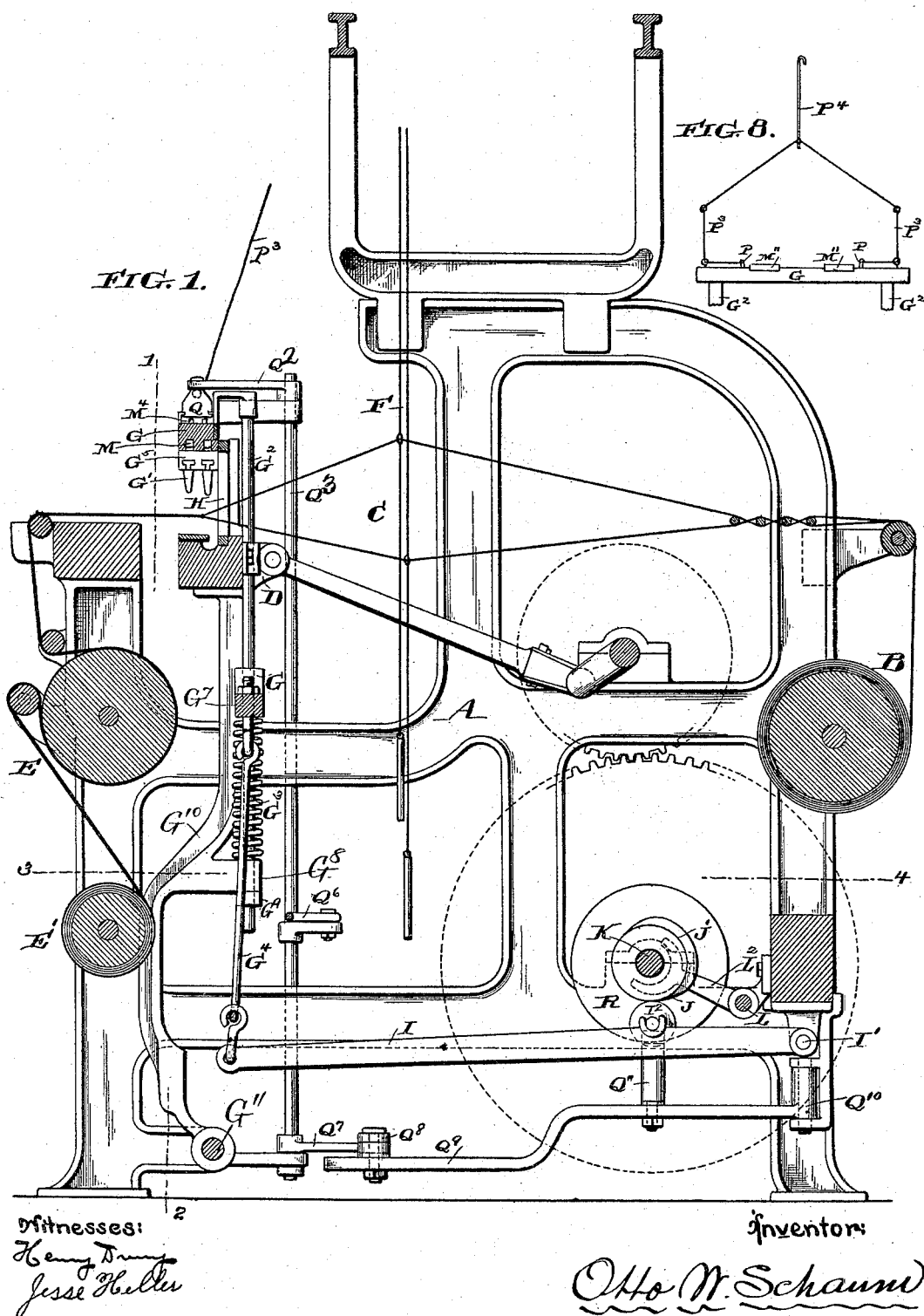
(No Model.)

5 Sheets—Sheet 1.

O. W. SCHAUM.
SWIVEL LOOM.

No. 493,651.

Patented Mar. 21, 1893.



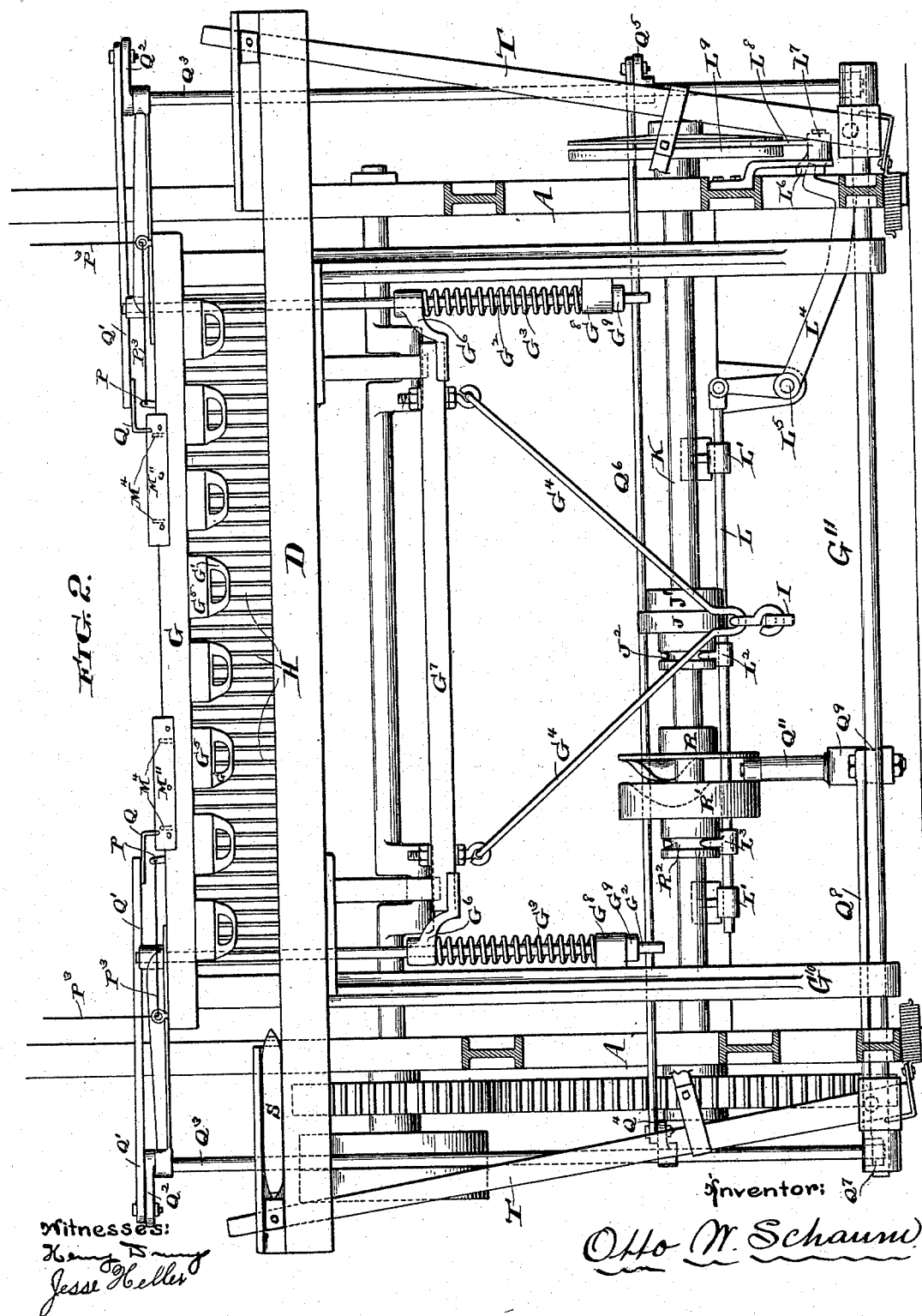
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5 Sheets—Sheet 2.

O. W. SCHAUM.
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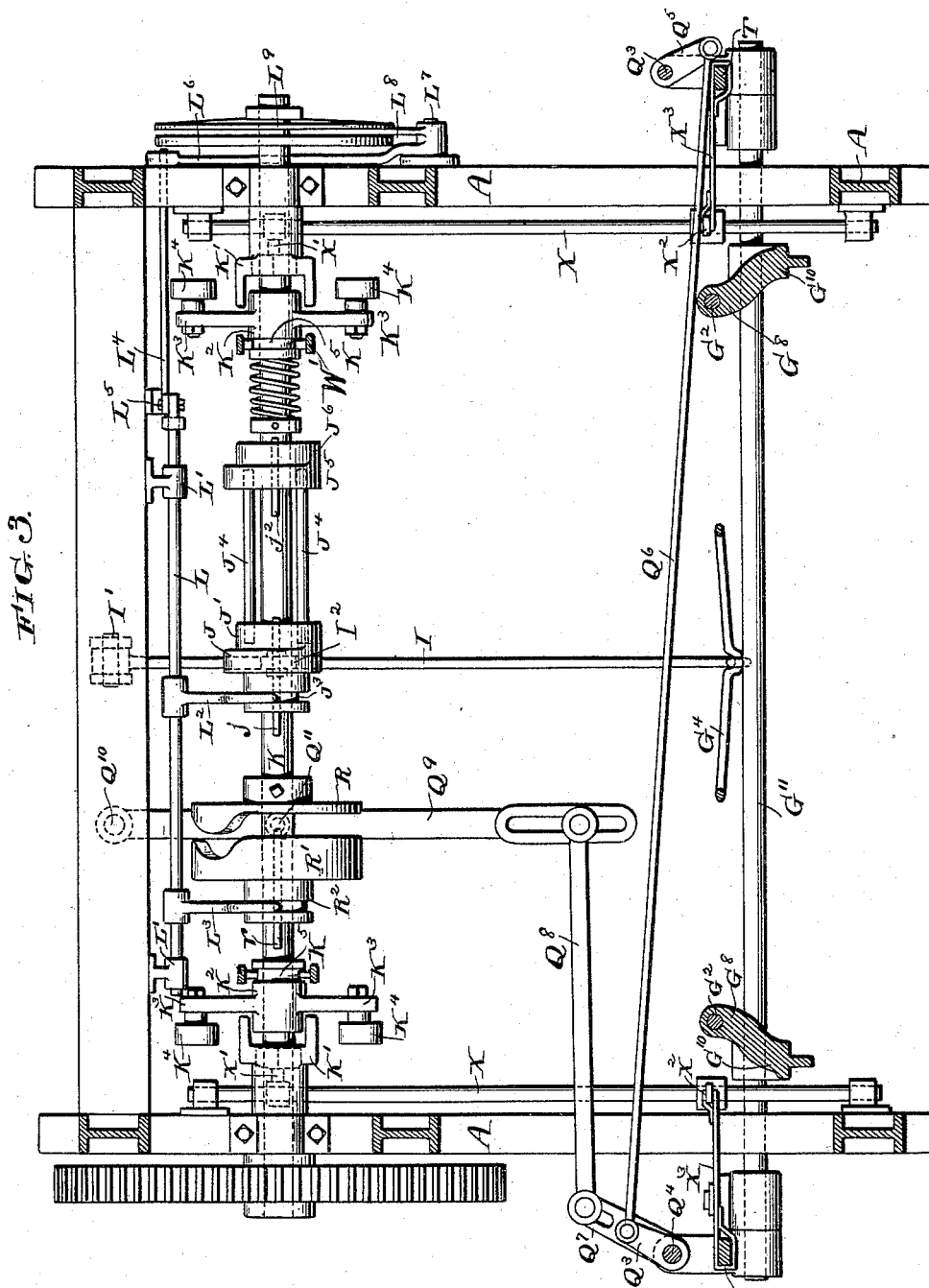
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5 Sheets—Sheet 3.

O. W. SCHAUM.
SWIVEL LOOM.

No. 493,651.

Patented Mar. 21, 1893.



Witnesses:
Henry D. May
Joshua M. Ketch Jr.

Inventor:
Otto W. Schaum
by his atty.
Francis J. Chambers

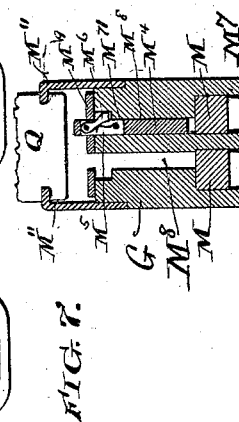
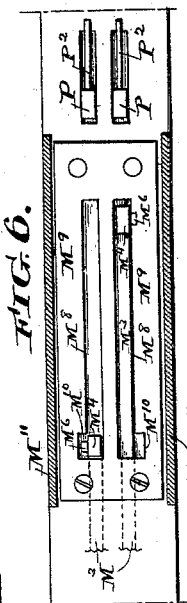
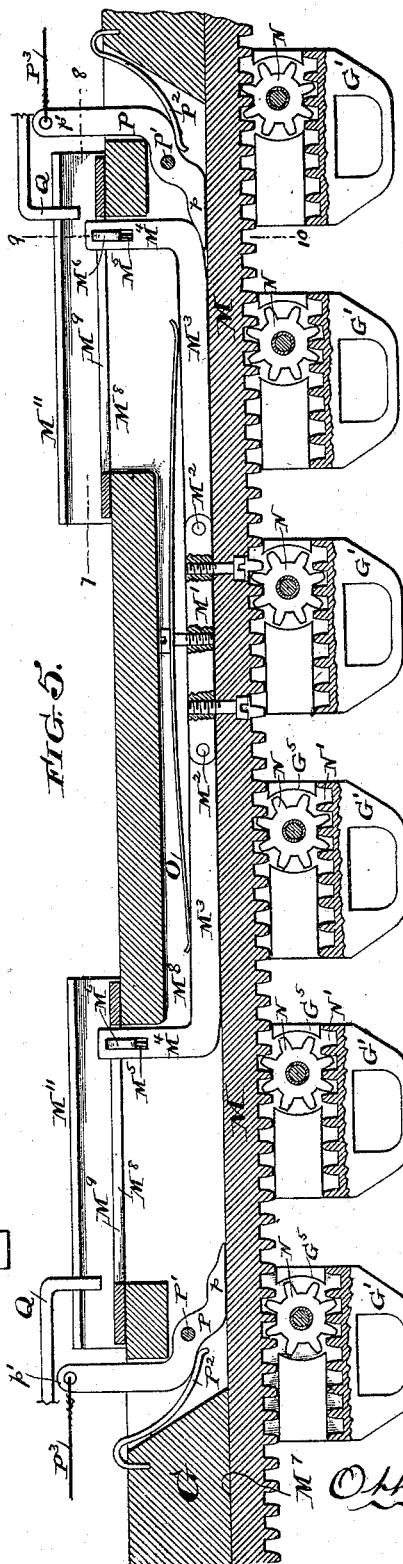
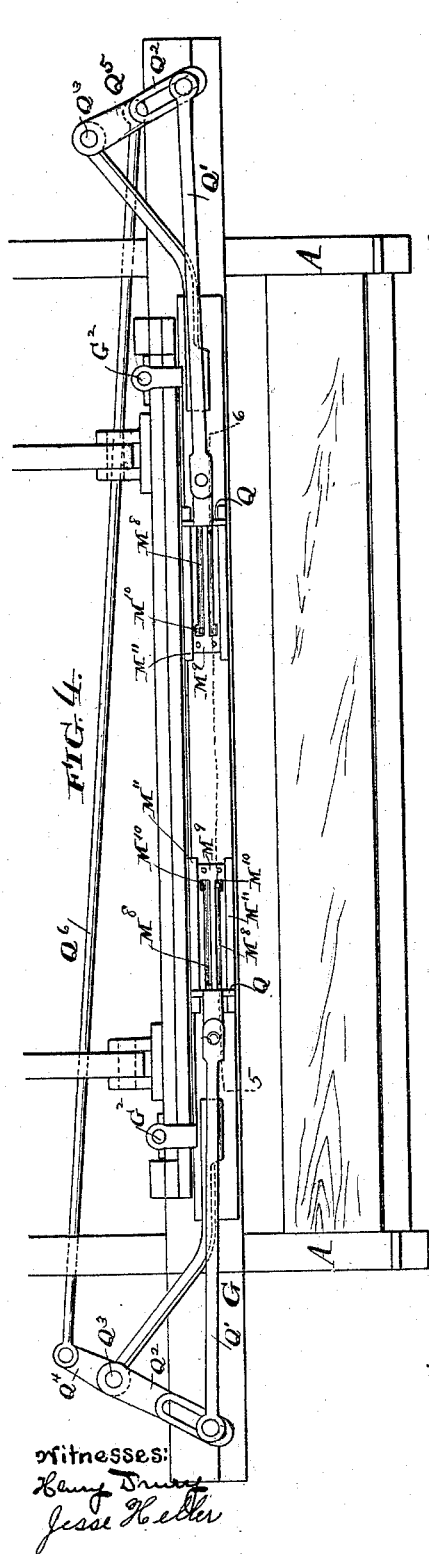
(No Model.)

5 Sheets—Sheet 4.

O. W. SCHAUM.
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Inventor:

Otto M. Schaum

(No Model.)

5 Sheets—Sheet 5.

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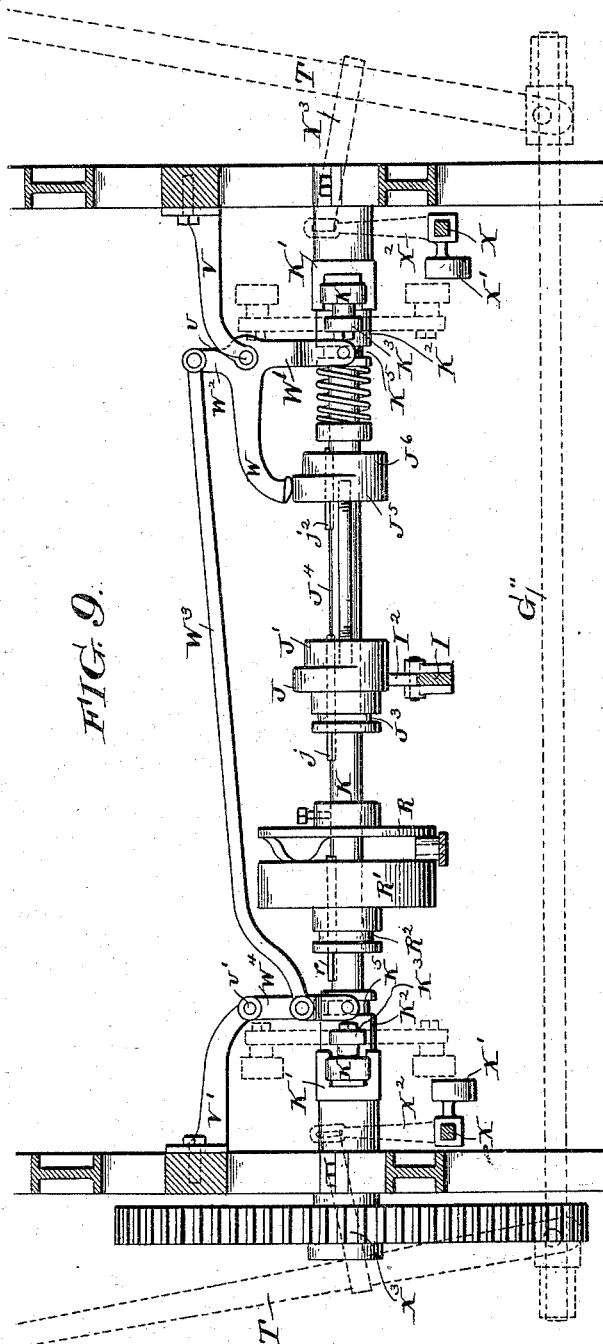


FIG. 9.

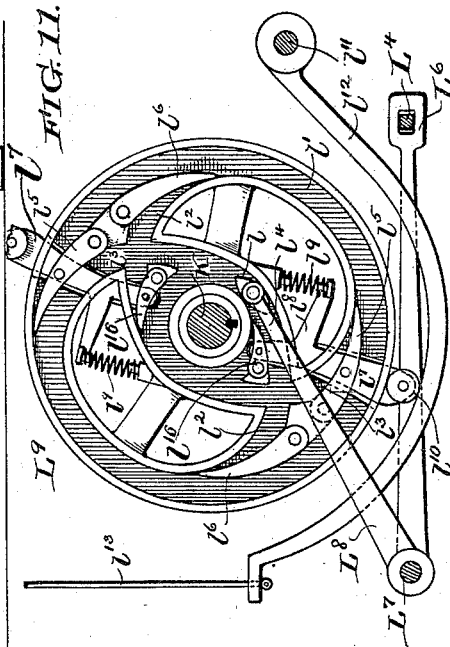


FIG. 11.

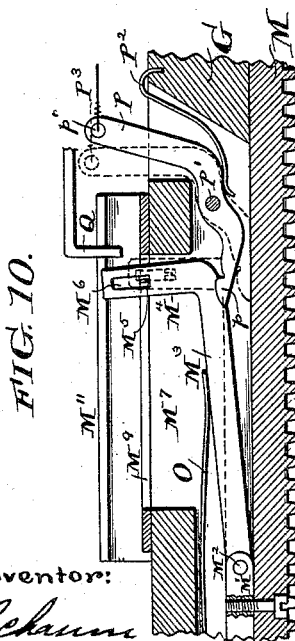


FIG. 10.

Witnesses:
Henry D. May
Joshua M. Hatch, Jr.

Inventor:
Otto W. Schaum
by his atty
Francis T. Chambers

UNITED STATES PATENT OFFICE.

OTTO W. SCHAUM, OF PHILADELPHIA, PENNSYLVANIA.

SWIVEL-LOOM.

SPECIFICATION forming part of Letters Patent No. 493,651, dated March 21, 1893.

Application filed May 20, 1891. Serial No. 393,475. (No model.)

To all whom it may concern:

Be it known that I, OTTO W. SCHAUM, of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Swivel-Looms, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that class of looms in connection with which what are known as swivel-shuttles are used; and particularly to mechanism for operating the swivel-shuttles.

In looms of the class referred to the swivel-shuttles move in carrier-blocks which in turn are secured to the swivel shuttle supporting bar; the shuttles are provided with racks which engage with spur-wheels journaled in the carrier-blocks, and longitudinally-moving racks are secured in the swivel shuttle support, the motion of which racks causes the gear-wheels to revolve and the shuttles to pass across the space between adjacent carrier-blocks. The swivel shuttle support is secured in front of the reed and is made longitudinally-movable normally maintaining a position by which the swivel-shuttles are held above the shed but capable of being depressed so as to bring the swivel-shuttles within the shed.

In the above-described particulars my loom is similar to those which are already well-known in the art the construction being shown for instance in the patent to Wadsworth No. 338,891 of March 30, 1886.

The object of my invention is to provide improved means for operating the longitudinally-moving racks supported in the swivel shuttle support; and incidentally in connection with the improvement in connection with the rack-actuating mechanism, to improve the mechanism for actuating the swivel-shuttle supporting bar.

The nature of my improvements will be best understood as described in connection with the drawings in which they are illustrated and in which,—

Figure 1 is a side elevation partly in section of a loom provided with my improvements, Fig. 2 a front elevation partly in section of the same omitting the picking bowls and their actuating mechanism taken on section line

1—2 of Fig. 1, Fig. 3 a plan view taken on the sectional-line 3—4 of Fig. 1 and showing the bowls and their actuating mechanism, Fig. 4 a plan view showing the upper part of the swivel-shuttle supporting beam and mechanism connected therewith, Fig. 5 an enlarged sectional elevation through the swivel-shuttle support taken on the line 5—6 of Fig. 4, Fig. 6 a plan view taken on the line 7—8 of Fig. 3, Fig. 7 a cross-section taken on the line 9—10 of Fig. 5; Fig. 8 a view of the swivel shuttle support showing the way in which the lifters, hereinafter described, are rigged. Fig. 9 is an elevation of shaft K and the mechanism connected therewith, Fig. 10 a sectional view showing the action of the lifter, and Fig. 11 is a face view of the cam L².

A is the frame of the machine; B the warp beam; C the shed; F the harness; D the lay; E and E' the take-up and cloth rolls.

G is the swivel-shuttle supporting beam; G' the swivel shuttles; G² rods supporting the beam G and made vertically-movable as shown; G³ springs operating to hold the rods and beam in their uppermost position; G⁴ links connected with a cross-bar G⁷ the ends, G⁶, of which are secured to the rods G², the springs G³ being situated between the ends G⁶ and bearings G⁸ attached to the lay shafts G¹⁰ which are supported on the rock shaft G¹¹ and through which bearings the ends of the rods G² are permitted to slide; rings or collars G⁹ secured on the ends of the rods G² limit their upward motion. The links G⁴ are attached to the end of a lever I pivoted at I' and having a roller I² journaled upon it which rests on a cam J J', the function of which will hereinafter be described.

G⁵ are the carrier-blocks secured to the beam G and in which the swivel shuttles G' move.

H represents the reed of the loom.

K is the shaft to which the cam J J' is keyed as shown at j; this cam is made up of two parts one, J, in the form of an eccentric which will, by depressing the lever I, draw down the swivel-shuttle support so as to bring the swivel-shuttles within the shed, the other part, J', of circular form concentric to the shaft K and of such diameter as will not affect the lever I or tend to draw down the shuttles. The parts J and J' are secured together and keyed

to shaft K so as to be longitudinally movable along it; they are provided with a collar J³ in which collar rests the yoke of a lever L² secured to a longitudinally-movable shaft L¹ journaled in bearings L' L' and connected to the end of a bell-crank lever L⁴ pivoted at L⁵ and connected at its other end with an arm of a lever L⁶ pivoted at L⁷, the other arm of which, marked L⁸, rests in the groove of a cam L⁹. In addition to the fork lever L² the rod L carries another similar fork lever L³ the ends of which rest in the collar R² of a movable cam-section R' the use of which will hereinafter be described. The shaft K also serves to actuate the pick levers, the movements of which as well as the mechanism for throwing them out of operation when the swivel shuttles are drawn down to make a pick, are shown in Figs. 3 and 9; in these figures K' and K' indicate fork clutches secured to, and rotating with shaft K.

K², K² are hubs supported on shaft K, but not secured to it, from these hubs extend arms K³ to the ends of which are secured the bowls K⁴. When the hubs are moved outward along the shaft K the arms K² are engaged by forks K' and caused to rotate with the shaft, and in that position the bowls strike against and depress arms X' which are secured to rock shafts X as are also arms X² to the ends of which are attached straps X³ connected at their other ends with pick levers T T which actuate the ground shuttle in the usual way. It is necessary that the ground shuttle should be thrown out of operation when the swivel shuttles make a pick, and to secure this result in the plan shown I secure to shaft K by means of a feather J² a cam J⁵ J⁶ in general character like cam J J', and movable with it along the shaft; rods J⁴ J⁴ connecting the two cams as shown. To a bracket V. I pivot at v a lever W W' W² the arm W of which is in the path of cam J⁵ J⁶, the arm W' forked and engaged with a collar K⁵ of the hub to the right of the drawings, while to the arm W² is secured one end of a rod W³, the other end of which is attached to a forked lever W⁴ pivoted at v' to a bracket V' and engaging at its other end the collar K⁵ of the hub K² to the left. When the end of the arm W rests on the circular part J⁶ of the cam the bowls are in their outer position and engaged by the forks K' but when the cam J J' is shifted to depress the swivel shuttles, the cam J⁵ J⁶ also shifts and at the same time as cam J acts to draw down the swivel shuttles, the cam J⁵ pushes up the arm W and, by the connections described, draws out of operation the bowls K⁴.

The specific mechanism above described forms no part of this invention, but forms subject matter for another application filed May 12, 1892, Serial No. 432,720.

At this point I will also briefly describe the construction and operation of cam L⁹, which cam however, forms no part of my invention,

and is shown simply as one and a good device for actuating rod L.

Referring now to Fig. 11 it will be seen that cam L⁹ has two concentric grooves l and l' connected by grooves l² l³ as shown, and is provided with switches l¹⁶ l¹⁶, l¹⁵ l¹⁵, l¹⁵ l¹⁵; on each side switches l¹⁶ and l¹⁵ are attached to a rod l', which by means of a spring l¹³ acting on an arm l¹⁸ is normally forced out so as to hold the switches l¹⁶ and l¹⁵ in their outer position as shown at the top of Fig. 11, the bar l' has a roller l¹⁰ at its end, l¹² is a shoe pivoted at l¹¹ and moved up or down by a cord l¹³ actuated by the Jacquard apparatus. When shoe l¹² is drawn up the roller l¹⁰ runs against it and the bar l' and attached switches are moved in as shown at the bottom of Fig. 11. l¹⁴ is a runner adapted to move in the cam grooves and to which is attached the end L⁸ of the lever L⁸ L⁶, the arm L⁶ of which engages and actuates the lever L⁴ which in turn moves rod L. Normally the runner l¹⁴ remains in groove l but when shoe l¹² is drawn up and the switches moved as described it rides up on switch l¹⁶ passing through groove l² and raising switch l¹⁶ passes into groove l' in doing so of course moving rod L and as described shifting the cam to bring the swivel shuttles into operation and disconnect the ground shuttle pick levers.

Returning now to the swivel-shuttle supporting beam, M M indicate the longitudinally-movable racks of which two, corresponding to two rows of shuttles, are shown in the drawings; but it will be understood that any desired number from one up may be used. The racks M move in slots M⁷ formed at the bottom of the beam G and which slots are continued entirely through the beam at M⁸ M⁸; metal plates M⁹ slotted to correspond with the slots M⁸ are shown as resting upon the top of the beam G. To the center of each rack M a bar M' is bolted, to each end of which, bars M³ are pivoted at M² M², the free ends, M⁴, of the bars M³ being bent upward so as to extend through the slots M⁸ M⁸, the length of which slots correspond to the longitudinal motion of the racks M. The pivoted rods M³ M⁴ are the devices through which motion is communicated to the racks M. Wipers Q reciprocating over the slots M⁸ and the slots in plate M⁹ in such a way that they will not come in contact with the ends M⁴ of the pivoted levers M³ unless the said levers are pushed up into their paths and this elevation of the pivoted lever is accomplished at proper times by means of a lifter as P which lifter is actuated at proper times by the Jacquard apparatus connected with the loom but not shown in the drawings.

Before describing the special construction of the pivoted levers, wipers, and lifters illustrated in the drawings I will call attention to the gear-wheels N pivoted in the blocks G⁵ and which engage with the teeth of the racks M and with the corresponding teeth of racks

N' on the shuttles G'. And I will also note that a spring O should be employed to hold the pivoted levers M³ downward at all times except when they are thrown up into operative position by the lifters.

As shown in the drawings it will be noted that the slotted plates M⁵ have recesses M¹⁰ on their inside ends and that a slot M⁵ is formed in the end M⁴ of levers M³. In the slot M⁵ is pivoted a latch M⁶ pressed outward by a spring M⁷ (see Fig. 7) so that when the lever M³ is lifted the latch M⁶ will, as soon as it has passed above the slot in plate M⁵, spring out and rest upon the plate M⁵ in which a corresponding slot is formed thus holding the lever M³ in the position to which it has been lifted and so that the end M⁴ will lie in the path of the wiper Q which, moving inward, will carry with it the rod M³ and cause the rack M to make a longitudinal movement; as soon as the latch M⁶ comes over the recess M¹⁰, which it does at the end of the stroke of the wiper Q, the latch is no longer supported and the rod M³ is permitted to fall back to the position shown in Fig. 5.

Any convenient device for lifting the rods M³ may of course be used; that shown in the drawings consists of a bell-crank lever P pivoted at P' and held in the position shown in Fig. 5 by springs P². The ends p of the lifters rest upon or close to the racks M in normal position and so that they will be immediately under the pivoted rods M³ when the said rods are in the position which they occupy when the rack M is pushed over toward the lifter. Cords P³ attached, to the end p' of the lifter P are connected to a Jacquard hook P⁴ as shown in Fig. 8 so that both lifters of each rack are actuated at the same time; of course only that one which is in contact with a pivoted rod M³ performs any work—the other one moving idly; but by moving both together as shown the movement of any particular rack can be called for and insured irrespective of the position it occupies in the swivel-shuttle supporting beam.

Of course the lifters could be actuated independently but a valuable improvement is effected by their simultaneous movement. In Fig. 10 the lifter is shown in action.

Referring next to the wipers Q, of which it is only necessary to employ two, one over each series of slots M⁸, I will state that the said wipers are supported on guides M¹¹ and are given a simultaneous reciprocatory movement to and from each other. As shown the wipers Q are attached to rods Q' pivoted at the ends of arms Q² and which arms are secured to the ends of a pair of vertical rock-shafts Q³ Q³ supported on the lay swords; the rock-shafts are connected together by means of arms Q⁴ and Q⁵ united by rod Q⁶, and arranged as shown in Fig. 3 or so as to have an inverse reciprocatory movement. On the lower end of one of the rock-shafts Q³ (that to the left as shown) an arm Q⁷ is attached which arm is connected by a rod Q⁸ with a lever Q⁹ pivoted at Q¹⁰ and

having a pin Q¹¹ extending from it into the groove of a cam R R' supported on the shaft K. As shown one part, R, of this cam is fastened to the shaft K, while the other part, R', is keyed as shown at r to it so as to turn with it but to be movable to and from the part R, the movement being effected through the collar R² and the fork lever L³; when the two parts R and R' are moved together the cam becomes operative and remains so actuating the wipers through the gearing described but as soon as the part R' is moved away from the part R and the lever Q⁹ is moved out to the level of the high part of cam R the cam becomes inoperative and the movements of the wipers cease.

S indicates the main or ground shuttle of which there may be any desired number in the loom; T T the pick levers by which the ground shuttles are actuated.

From what has already been said the operation of my improved loom can be clearly followed. Whenever it is desired to bring the swivel-shuttles into operation the cam L⁹ or other device is brought into operation so that acting through the lever L⁸ L⁵ upon the lever L⁴ and through the levers L² and L³ upon the cams on shaft K the said cams are brought to operative position—the cam J acting through lever I and its connections draw down the swivel-shuttle support G until the swivel-shuttles are within the shed, and the parts of the cam R R' closing and acting through the lever Q⁹ and its connections to give the inverse reciprocatory movement to the wipers Q. The swivel-shuttles being now in proper position and the wipers Q moving to and fro above the slots M⁸ M⁹ the Jacquard apparatus is made to operate the lifters P at proper times throwing up one of the pivoted arms M³ into the path of one of the wipers which immediately comes in contact with it and through it effects a stroke of the rack and of the swivel-shuttles actuated by that particular rack. It will be seen that the different lines of swivel shuttles may, if desired, move simultaneously in different or the same directions and that any particular line can be called upon independent of the others; also that the form of the cam J may be such as will hold the swivel-shuttles in operative position while they make several strokes or such as will cause them to move up out of the shed after each stroke so that the ground shuttle may be thrown across through the shed before the swivel-shuttles are again brought into operative position. In fact, by my apparatus almost any desired arrangement of picks of both the swivel and ground shuttles may be effected.

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

1. The combination with a swivel-shuttle supporting-beam with one or more racks longitudinally movable therein, a rod as M³ pivotally attached to each rack, a lifter operated

by the jacquard arranged to throw up said pivoted rod into the path of a reciprocating wiper, and a wiper having a reciprocating motion arranged to engage the pivoted rod when
5 it is thrown up into its path and through it to actuate the connected rack.

2. The combination with a swivel-shuttle supporting-beam with one or more racks longitudinally movable therein, rods as M^3 M^3
10 pivotally attached to each rack as described, lifters operated by the jacquard arranged to engage one of said rods M^3 at each end of the movement of the rack so as to lift the end of the engaged rod when desired, and reciprocating wipers moving in opposite directions
15 as described and arranged to engage the pivoted rods when thrown up by the lifter and through them to actuate the rack.

3. The combination with a swivel-shuttle supporting-beam with one or more racks longitudinally movable therein, rods as M^3 M^3
20 pivotally attached to each rack as described, lifters operated by the jacquard arranged to engage one of said rods M^3 at each end of the movement of the rack, mechanism for actuating each pair of lifters simultaneously so as to lift the end of the engaged rod when desired, and reciprocating wipers means for moving them in opposite directions as described
25 said wipers being arranged to engage the pivoted rods when thrown up by the lifter and through them to actuate the rack.

4. In combination with a swivel-shuttle supporting-beam, a series of racks longitudinally movable therein, rods M^3 M^3 pivoted to each
35 rack and beneath a slot in the said beam, lifters P arranged to engage each rod M^3 alternately, mechanism for actuating each pair of lifters simultaneously and wipers Q Q having
40 a constant opposite reciprocating movement

over the rod ends, all substantially as and for the purpose specified.

5. The combination with the swivel-shuttle supporting-beam having slots M^8 and slotted plates M^9 with end recesses M^{10} of a reciprocating rack M, rods M^3 pivoted thereto, and
45 having their ends extending upward in slots M^8 spring latches M^6 in the ends of rods M^3 arranged to hold the said ends above the top of slotted plates M^9 and lifters P operated by the
50 jacquard and arranged to engage and lift the rod ends, all substantially as specified.

6. In a loom, the combination of the swivel-shuttle supporting-beam the reciprocating racks M having pivoted rods M^3 as described
55 means for lifting the ends of said rods into the path of the wipers, the reciprocating wipers Q, a movable cam R', means for moving the same as described, and mechanism connecting said cam and the wipers Q so that
60 when in operation said cam will actuate both wipers in opposite directions.

7. In a loom, the combination of the swivel-shuttle supporting-beam the reciprocating racks M having pivoted rods M^3 as described
65 means for lifting the ends of said rods into the path of the wipers, the reciprocating wipers Q, a movable cam R', mechanism connecting said cam, and the wipers so that when in operation said cam will actuate both wipers in
70 opposite directions; a movable cam J, mechanism connecting said cam with the beam so as to draw said beam down at proper times, and mechanism for simultaneously engaging and disengaging cams R R' and J, substantially as and for the purpose specified.

OTTO W. SCHAUM.

Witnesses:

GEORGE HOUSE,
JOSHUA MATLACK, Jr.