

No. 803,511.

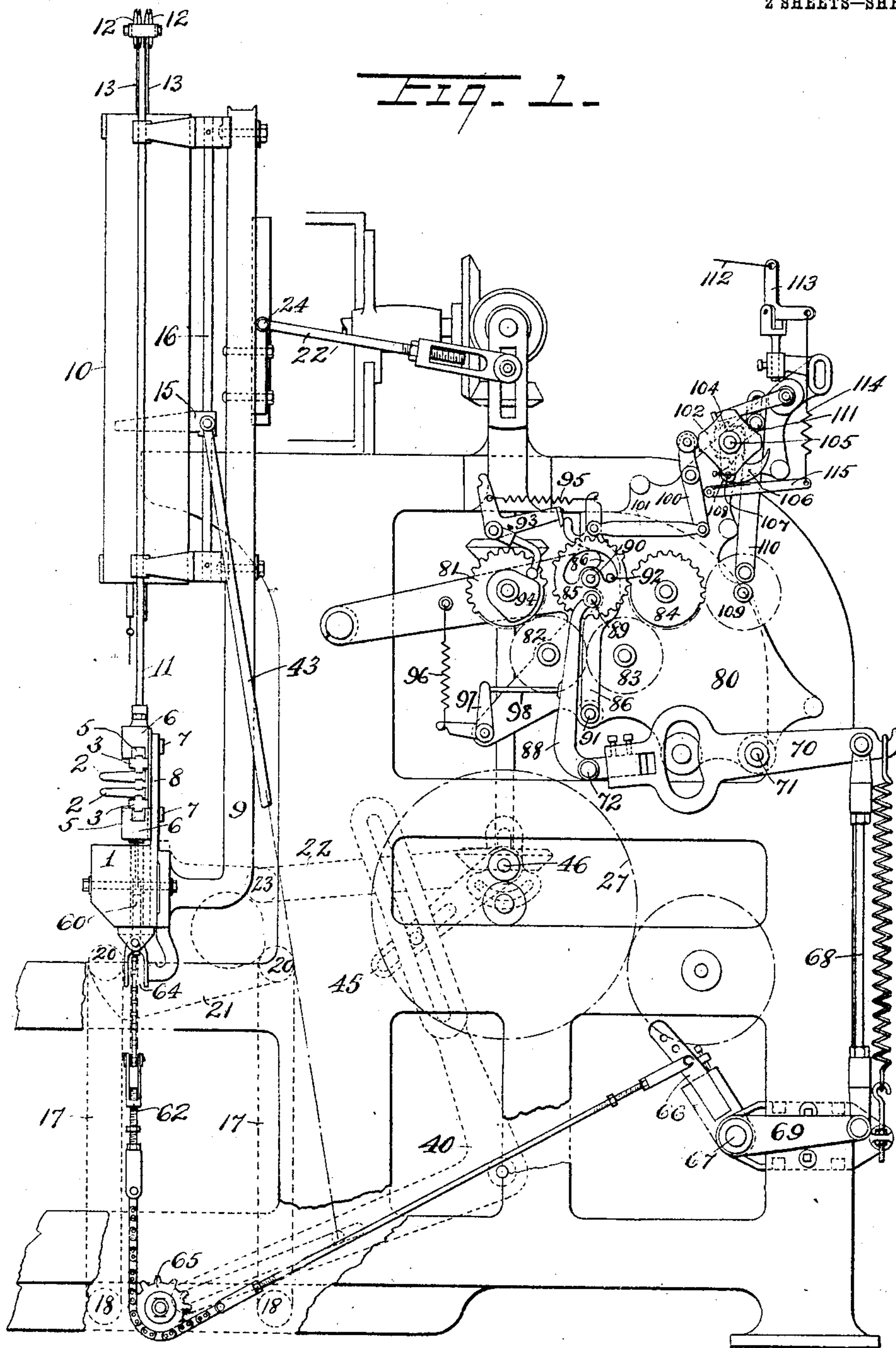
PATENTED OCT. 31, 1905.

O. W. SCHAUM.

LOOM.

APPLICATION FILED JAN. 21, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

Calder Freber

D. M. Stewart

INVENTOR

Otto W. Schaum

BY

D. M. Stewart

ATTORNEY.

O. W. SCHAUM.
LOOM.

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2 SHEETS—SHEET 2.

Fig. 2.

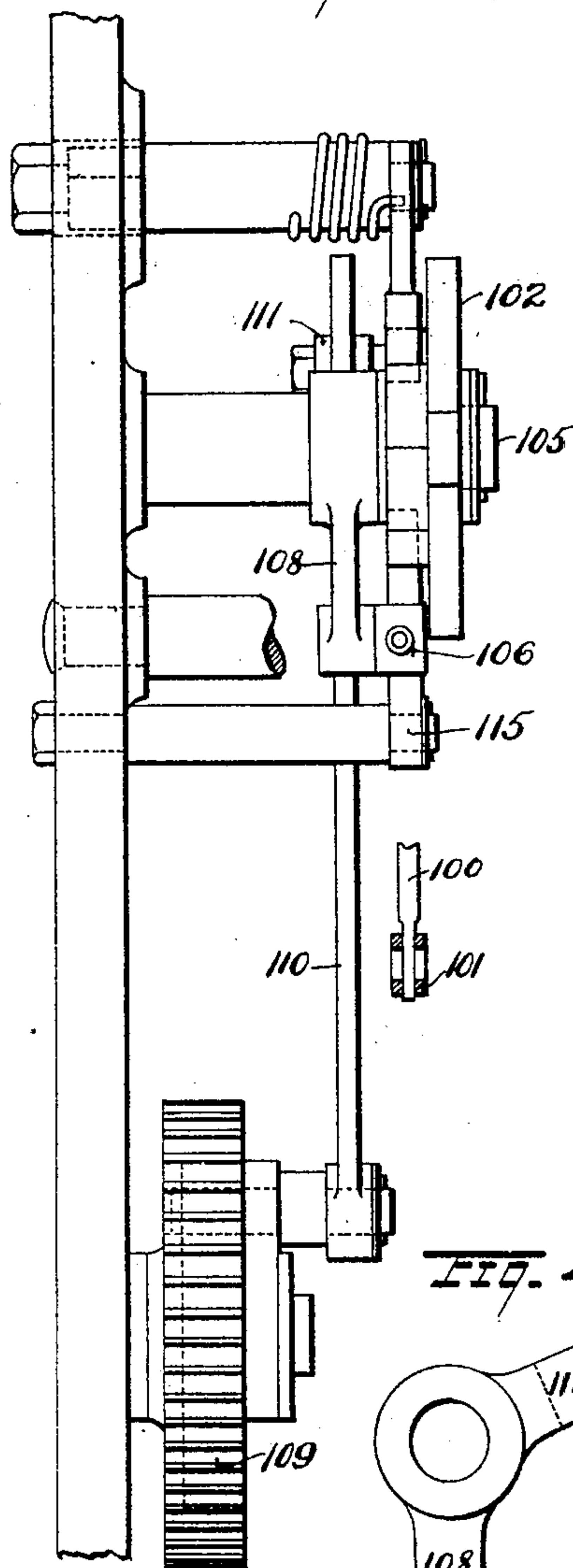


Fig. 3.

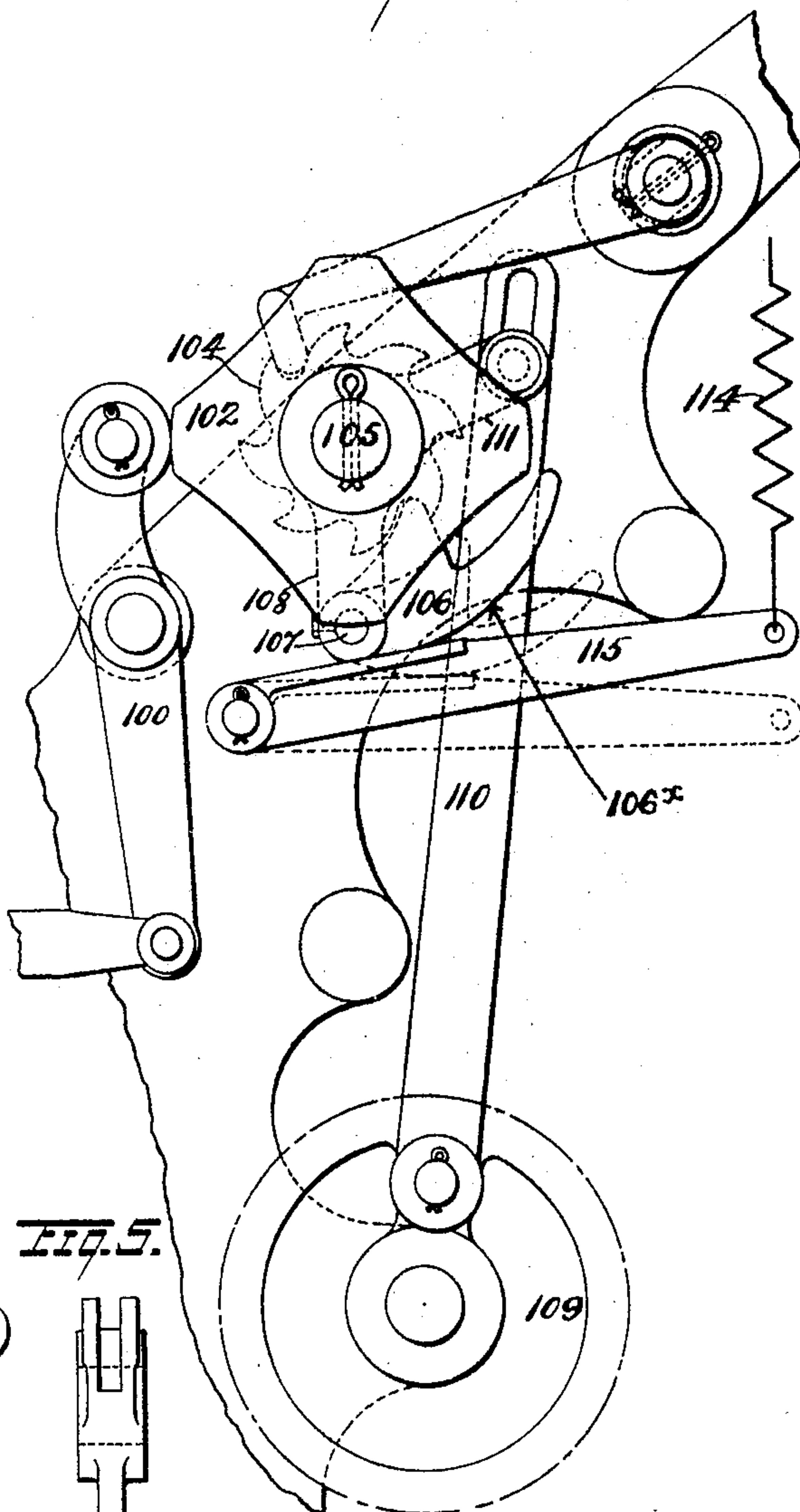


Fig. 4. Fig. 5.

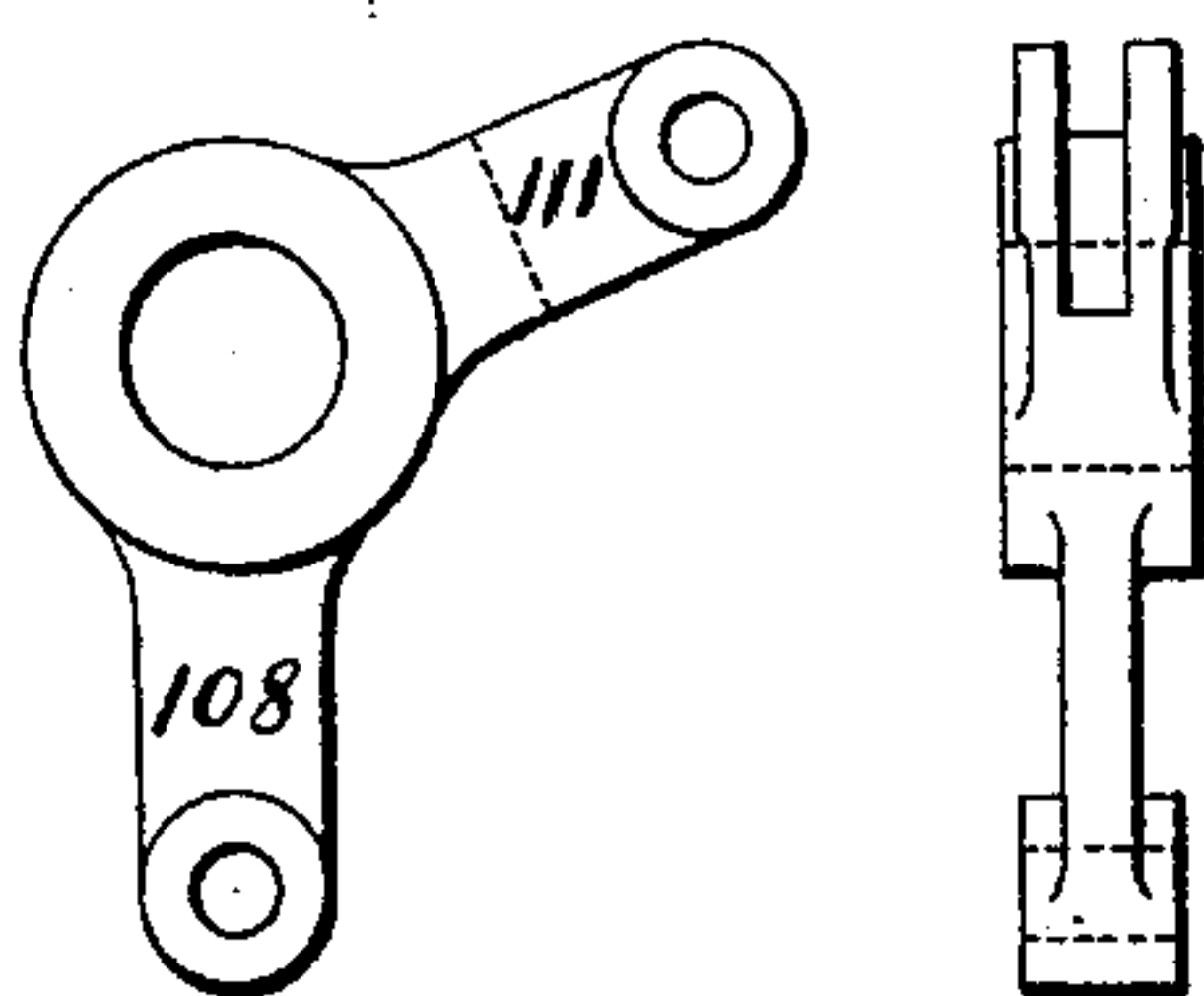
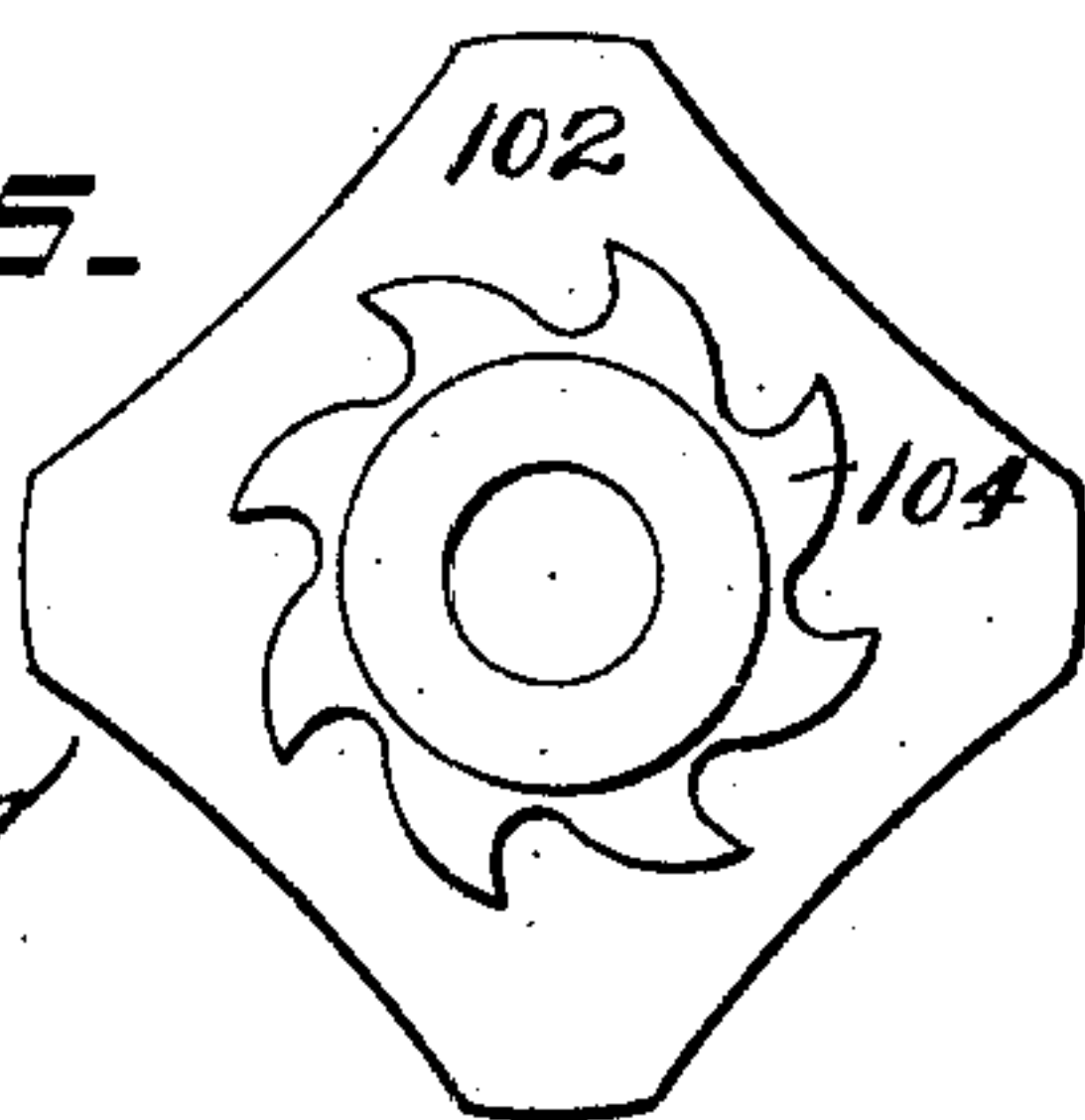


Fig. 6.



Witnesses
Caleb J. Fieber
D. Stewart

Inventor
Otto W. Schaum
By *[Signature]*
Attorney

UNITED STATES PATENT OFFICE.

OTTO W. SCHAUM, OF PHILADELPHIA, PENNSYLVANIA.

LOOM.

No. 803,511.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Original application filed October 5, 1903, Serial No. 175,779. Divided and this application filed January 21, 1904. Serial No. 189,961.

To all whom it may concern:

Be it known that I, OTTO W. SCHAUM, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Looms, of which the following is a specification.

The invention to be hereinafter described relates to looms, and more particularly to that general type wherein two or more banks of shuttles are employed in the production of figures or patterns on a wide fabric—as, for instance, in that class of such devices known as “swivel-loom.” In this class of looms it is desirable that any one of the several banks of shuttles be readily brought to position with respect to the open shed, so that the yarn or thread carried by such bank of shuttles may be properly woven in the fabric, and it is equally desirable that such bank of shuttles be either retained in said position for a number of picks or successively changed for another bank under the dictates of the figure desired.

With these generally-stated characteristics in view the object of the present invention is to provide means whereby any one of a plural number of shuttle-banks may be selectively brought into operative position with respect to the shed formation to have the yarns or threads carried thereby incorporated into the fabric for one or a plural number of picks or be successively changed at each pick, as desired, the movement of the banks of shuttles being controlled by pattern mechanisms, preferably in the form of a jacquard; and the invention consists of the parts and combinations to be hereinafter described, and definitely pointed out in the claims.

Figure 1 is a side elevation of a loom, showing my improvements in connection with the coöperating mechanisms indicated in my Patent No. 786,237, dated March 28, 1905. Figs. 2 and 3 are enlarged views showing more clearly my improved indicator or reversing mechanism; and Figs. 4 and 5 and Fig. 6 are detail views of parts thereof.

Upon the lathe or batten beam 1 is carried, as shown, two banks of shuttles 2 2, guided, as usual, in properly-spaced ways or races formed by suitable shuttle-carrying blocks 3 3, which blocks are provided, as usual, with pinions engaging the shuttles. These pinions are also arranged in engagement with laterally-slidable racks 5 5, mounted in transverse beams 6 6, the properly-timed movements

of each of which racks effect the throwing of the engaging bank of shuttles across the warp-threads extending between the laterally-spaced series of carrying-blocks. The vertically-spaced transverse beams 6 6, together with the intervening shuttle-carrying blocks 3 3, are rigidly connected by vertical bars 7 7 and are movably secured to rigid upward extensions 8 on the batten-frame, so as to be capable of vertical movement relative to the latter sufficient to bring one or other of the several banks of shuttles into the plane of the sheds formed, as usual, in the warp-threads between the shuttle-carrying blocks. The batten-beam 1 also carries a rigidly-secured vertically-extending bracket 9, to the upper end of which is fastened, as shown, the usual marionette-frame 10 and shuttle-operating mechanism therein, acting upon the shuttle-engaging racks 5 5. Guide-standards 11 11, rising from the rigidly-united beams 6 6, carry at their upper ends, as shown, a pair of pulleys 12 12, over which pass the cords 13 13, by means of which the shuttle-operating racks 5 5 are moved in one direction or the other, said cords passing over lower pulleys (not shown) and being connected with said racks, as usual. These movements are controlled as desired by the vertical movement of the shuttle-carrying beams 6 6 in connection with a cross-head movable device 15, guided on a vertical rod 16 and arranged to engage the usual pivoted fingers on the slide-rods in the marionette-box, to which the cords 13 are attached, as determined by the operating mechanism for said cross-head.

The batten-beam 1 and the mechanisms carried thereby are mounted, as shown, upon carrying-links 17 17, adjustably pivoted at their lower ends 18 to the frame of the machine and at their upper ends 20 to the batten-brackets 21, substantially as indicated in Patent No. 497,824, issued to me May 23, 1892, and a parallel to-and-fro movement is imparted thereto through approximately horizontal links 22 22', pivoted, respectively, to said batten-brackets 21 at 23 and to the upper portion of the vertical marionette-carrying brackets 9 at 24, while the movable marionette device 15 is automatically operated, as shown, through a bell-crank 40, adjustably connected thereto by means of a rod 43 and suitably oscillated from a crank-pin 46 on the wheel 27 through an adjustably-fixed crank-arm 45, all of which mechanism is more fully described in my said patent.

The vertical movement of the shuttle-carrying beams 6 6 is effected, as indicated, by means of a bottom lift mechanism comprising lifting devices 60, carried by the batten and operated by a chain connection 62, which passes over guide-pulleys 64 65 to a crank-arm 66, fixed to a shaft 67, mounted in the loom-frame. The required rocking movement is transmitted to this shaft 67 from the change-motion mechanism, the horizontal lever 70 of which is connected by a rod 68 to another crank-arm 69, fixed to said shaft 67.

The change-motion shown for vertically adjusting the shuttle-races through the bottom lift mechanism described is somewhat similar to mechanisms heretofore employed in loom construction, but is novel in the improved relative arrangement of the parts, as well as in certain details. The motion is transmitted to the bell-cranks 60, mounted on the batten 1, through the horizontal lever 70, already referred to. This lever and the connected change-motion is adapted, as shown in the drawings, for two banks of shuttles, though capable of being modified without material change, so far as my invention is concerned, to operate additional banks, as heretofore. The lever 70 is pivoted at 71 to the frame 80, which carries the change-motion, and its inner end is pivoted at 72 to a vertical crank-rod 88, the upper end of which is eccentrically connected at 89 to the vibrator crank-gear 85. This crank-gear is carried at 90 by a vertical vibrator-lever 86, the lower end of which is pivoted to the frame 80 at a point 91 located approximately in a vertical tangent to the arc in which the pivotal connection 72 of lever 70 swings and as near as convenient to this pivotal connection on which the crank-rod 88 turns, the effect of this arrangement being that this crank-rod and the carrying-arm 86 for the crank-gear are at all times approximately vertical and held practically in balance and that their crank-gear connections are swung equally by the shifting of the crank-gear, thereby avoiding any movement of the lever 70 by such shifting of the crank-gear. The crank-gear 85 is, as usual, arranged to be rotated about a half-turn in opposite directions to effect the required movement of the horizontal lever 70, this being accomplished by means of a semicircular series of meshing gears 81, 82, 83, and 84, grouped around said crank-gear, which latter is arranged to be swung laterally into engagement with one or other of end gears 81 or 84 of said semicircular series. These end gears, as well as the crank-gear 85, are properly mutilated, as usual, in their engaging parts, so as to insure proper meshing for the required semirotation of said crank-gear in opposite directions by the respective end gears, a stop 92 being provided on the carrying-arm 86 to positively limit such rotation and the gears 81 or 84 being freely rotatable

during the interval between the lateral shifting of the swinging arm 86 and its attached crank-gear. A stop-lever 93 is swung by a spring 95 and by a cam 94 on gear 81 into or out of engagement with the carrying-lever 86 to retain the crank-gear 85 in proper engagement with gear 84 until it is desired to swing it laterally, as described. To retain the crank-gear 85 in contact with the stop 92 when said gear is idle, I provide a spring 96, connected to a bell-crank 97, having an arm 98 arranged to yieldingly press the crank-rod 88 in the required direction, said rod being otherwise nearly balanced in approximately vertical position. This shifting of the crank-gear 85 to effect the required vertical movement of the shuttle-races is in my improved construction effected by a novel indicator mechanism, the operation of which is regulated by the jacquard or other pattern means in harmony with the shedding mechanism and the shuttle movements described without throwing the actual work of shifting upon the jacquard-pattern and with a simplifying of the latter and of the general operation. This indicator mechanism comprises, as shown, a rocking lever 100, connected by a link 101 to the vibrator crank-gear lever 86, and a star-shaped cam 102, arranged to engage said lever, and, in connection with the spring 95, attached to said vibrator-lever, as shown, operate the latter. This cam, which is provided with a concentric ratchet-wheel 104, is mounted on a shaft 105 and is intermittently rotated by means of a pawl 106, pivoted at 107 to one arm of a pawl-carrying lever 108, pivotally mounted on said shaft 105 and regularly oscillated thereon by means of a crank-gear 109, meshing, as shown, with the end gear 84 of the change-motion and adjustably connected by a crank-rod 110 to an arm 111 of said pawl-carrying lever. The engagement of the pawl 106 with the ratchet-wheel 104 of the cam will cause the latter to be turned one-eighth of a revolution, as shown, for each oscillation of the pawl-carrying lever, the ratchet-wheel being provided with eight teeth corresponding with the alternate projections and recesses on the periphery of the cam, while the disengagement of said pawl makes the oscillations of the lever inoperative. Thus the mere movement of the pawl into or out of engagement at proper times will control the movement of the cam and its connections to the carrying-arm 86 of the change-motion, the actual operation of which is, however, effected by the power mechanism of the loom through crank-gear 109. The jacquard mechanism is thus required only to operate the pawl 106, as required, and this is accomplished, as shown, by connecting the wire 112 therefrom to one arm of a bell-crank 113, the other arm of which has a yielding connection 114 to a pawl-engaging lever 115, upon which said pawl 106 is supported, so as to be moved into

engagement with the cam ratchet-wheel 104 or lowered out of engagement therewith by the pull upon or release of the jacquard wire or string 112.

5 It will be noticed that the pawl 106 when moved into or out of engagement with the ratchet-wheel 104 may be retained in either position during as many picks of the loom as desired, thus permitting an indicated weaving
10 operation to continue until a change is required and dispensing with a great number of the perforations in the pattern and of the indicator movements heretofore made thereby.

The cooperative arrangement of the several improvements embodied in the specific
15 construction shown and the advantages thereof have been already clearly indicated in the foregoing description. Modifications may be readily made without departing from the main
20 features of the invention.

From the construction of the indicator mechanism described and its adjunctive parts it will be seen that in operation the indicator-pawl 106 has a riding-surface 106^x, which
25 rests upon the jacquard-controlled indicator-lever 115, which is itself flexibly connected to the jacquard by means of the spring 114 and its end connection. Assuming the parts of the indicator mechanism to be in the position
30 shown by Fig. 3, with the end of the arm 100 resting upon the riser of the cam 102 and the indicator-pawl held in engagement with the ratchet-teeth 104 by the jacquard-controlled indicator-lever 115, it will be seen that one
35 bank of shuttles will be held with the shuttle-races in position to incorporate the threads of said bank of shuttles in the fabric. Should the jacquard call for a change in the banks of
40 shuttles, the indicator-lever 115 will be maintained in the position shown, whereupon the pawl will move the cam 102 the distance of one tooth upon the further rotation of gear 109, thereby permitting the end of arm 100
45 to fall into a depression of said cam with a consequent operation of the vibrator-gear and shuttle-banks, as will be obvious. In this operation it will be noted the curved surface of the indicator-pawl 106 will ride upon the sur-
50 face of the indicator-lever 115, the latter, while maintaining the pawl in engagement with the ratchet-teeth 104, yielding sufficiently by means of the flexible connection 114 to permit this operation. So long, therefore, as the jacquard maintains the indicator-lever 115 in
55 this position the banks of shuttles will continue to be changed at each pick. Should it be desired to maintain the same bank of shuttles in operative position for a plurality of picks, however, the jacquard under the call of
60 its pattern will permit the indicator-lever 115 to fall into the dotted-line position, Fig. 3, whereupon the engaging end of the pawl 106 will be moved out of operative relation with the ratchet-teeth 104 and the cam 102 will re-
65 main stationary. Thus it will be seen that

by the simple arrangement of indicator described, having a jacquard-controlled indicator-lever determining the operative or inoperative condition of such indicator mechanism, and consequently its connected parts, the banks
70 of shuttles may be selectively brought to and returned from operative position with respect to the shed formation at each pick of the loom or the same bank of shuttles may be maintained in such operative position for any de-
75 sired number of picks according to the character of figure desired to be produced.

While I have described the details of one form my invention may assume, it is to be understood that I do not regard the invention
80 as restricted thereto, as various details and types of mechanical devices may be substituted or employed within the scope of the present invention, and while I have described the invention in connection with swivel-
85 looms it is also to be understood that it may also be employed with other types of looms employing a series of shuttles.

For the purpose of identification I refer to the means for shifting or changing the posi-
90 tion of the banks of shuttles with respect to the lay as the "change-motion mechanism" and to the means for determining the operation or inoperation of such change-motion mechanism as the "indicator mechanism."
95

What I claim is—

1. In a loom, a plurality of banks of shuttle-races, change-motion mechanism for moving the same, and an indicator mechanism for controlling the operation of the change-motion
100 mechanism, said indicator mechanism comprising an intermittently-movable element, continuously-operating means for moving said element, and pattern-controlled devices for rendering the continuously-operat-
105 ing means functionally operative or inoperative for a number of picks.

2. In a loom, the combination of a plurality of shuttle-supports, a change-motion mechanism for moving said supports to bring differ-
110 ent shuttles into operative position, and an indicator mechanism to control the action and inaction of said change-motion mechanism, said indicator mechanism comprising an indicator-cam, continuously-acting means for op-
115 erating said cam, and pattern-controlled devices for rendering said continuously-acting means functionally operative or inoperative for a number of picks.

3. In a loom, a plurality of banks of shuttle-races, change-motion mechanism for moving the same to bring a desired bank of shuttle-races into operative position, an indicator
120 mechanism for controlling the change-motion mechanism, said indicator mechanism comprising an intermittently-movable element, continuously-operating means for moving said element, and yielding pattern-controlled de-
125 vices engaging the continuously-operating means and rendering the same functionally op-
130

erative or inoperative for a desired number of picks.

4. In a loom, the combination with a change-motion mechanism, of an indicator mechanism therefor, comprising an indicator-cam, means for determining the action of the change-motion mechanism from said cam, continuously-moving devices for operating said cam, and pattern-controlled means for rendering
10 said devices functionally operative or inoperative for a desired number of picks.

5. In a loom, the combination with change-motion mechanism, of an indicator mechanism therefor, comprising an indicator-cam, a
15 ratchet and a continuously-moving pawl for operating said cam, a jacquard-controlled indicator-lever for determining the operative relation between the ratchet and pawl, and yielding sustaining means for said indicator-lever
20 for enabling the said lever to maintain the operative relation between the pawl and ratchet for a plural number of picks.

6. In a loom, the combination with change-motion mechanism, of an indicator mechanism
25 ism therefor, comprising an indicator-cam, a

ratchet and pawl for operating said cam, means for continuously operating said pawl, a jacquard-controlled indicator-lever for determining the operative relation between the ratchet and pawl, and yielding sustaining means for
30 said indicator-lever for enabling the said lever to maintain the operative relation between the pawl and ratchet for a plural number of picks.

7. In a loom, the combination with a change-motion mechanism, of an indicator mechanism
35 ism therefor, comprising an indicator-cam, provided with a ratchet-wheel, a continuously-moving pawl for operating the ratchet-wheel and cam, and a jacquard-controlled indicator-lever for determining the operative and inop-
40 erative relation between the ratchet and pawl that the change-motion mechanism may be operated at each pick or maintained stationary for a plurality of picks.

In testimony whereof I affix my signature in
45 the presence of two witnesses.

OTTO W. SCHAUM.

Witnesses:

E. C. RHOADS,

JOHN THIEL.