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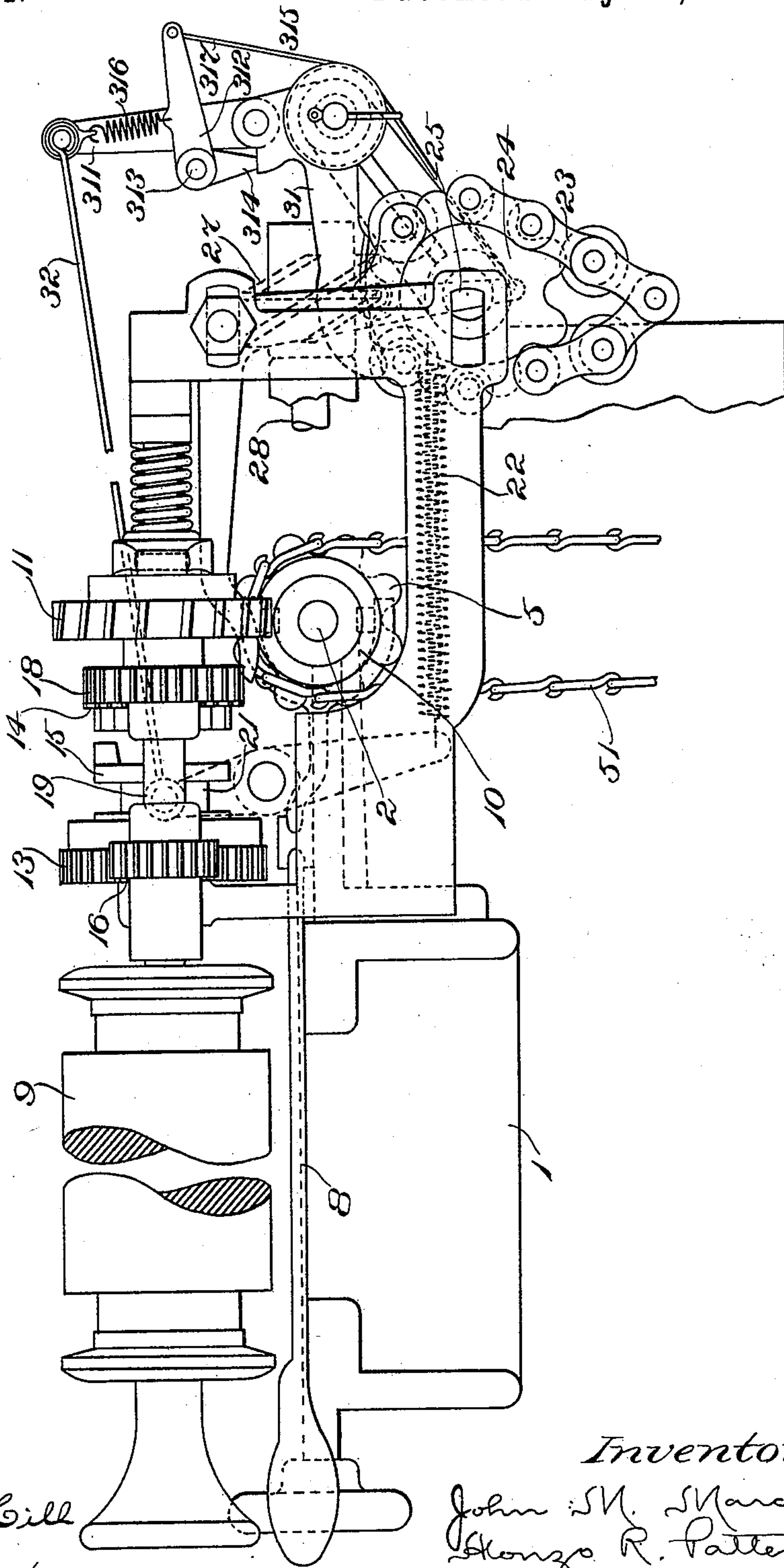
3 Sheets—Sheet 1.

J. M. MARCO & A. R. PATTEN.
PATTERN MECHANISM FOR LOOMS.

No. 583,234.

Patented May 25, 1897.

Fig. 1.



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(No Model.)

8 Sheets—Sheet 2.

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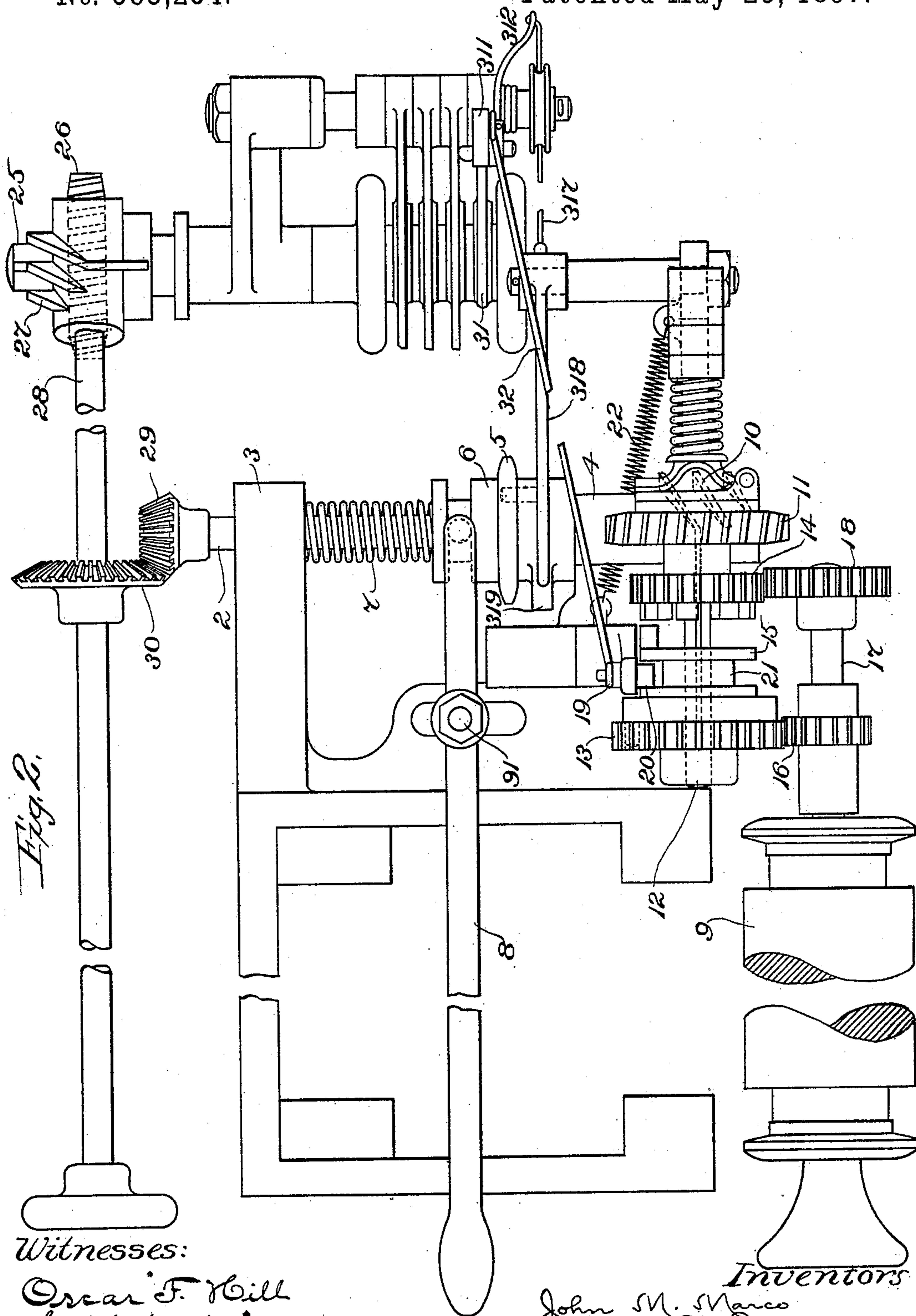


Fig. 2.

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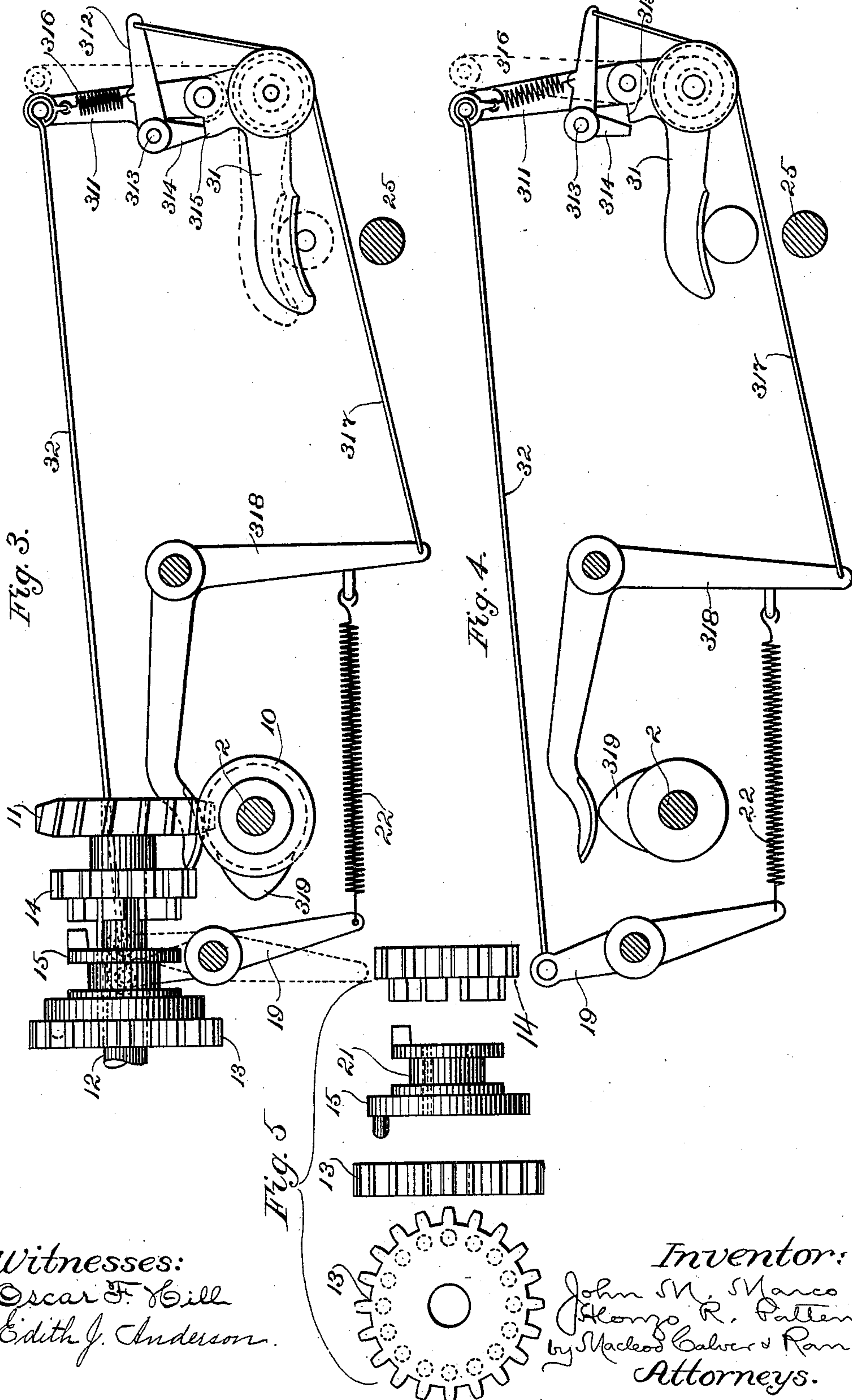
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UNITED STATES PATENT OFFICE.

JOHN M. MARCO, OF PHILADELPHIA, PENNSYLVANIA, AND ALONZO R. PATTEN, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO THE KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS.

PATTERN MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 583,234, dated May 25, 1897.

Application filed March 9, 1897. Serial No. 626,679. (No model.)

To all whom it may concern:

Be it known that we, JOHN M. MARCO, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, and ALONZO R. PATTEN, a subject of the Queen of Great Britain, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Pattern Mechanism for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention will be described first with reference to the accompanying drawings, after which the distinguishing characteristics thereof will be pointed out more particularly, and distinctly defined in the claims at the close of this specification.

Figure 1 of the drawings shows in elevation pattern mechanism having our invention applied thereto. Fig. 2 shows in plan the mechanism which is represented in Fig. 1, the pattern-chain, which is visible in Fig. 1, being omitted from Fig. 2. Fig. 3 is a diagrammatic view showing more particularly the features of our present invention. Fig. 4 is a view of similar character, representing the parts in a different position. Fig. 5 shows various details.

It has been proposed heretofore in connection with looms for weaving to apply to a pattern-chain or other pattern-surface the indicators pertaining to two patterns, the successive lines of indicators pertaining to one of such patterns alternating in order with those pertaining to the other pattern; also, to combine with a pattern-chain or other pattern-surface having two patterns applied thereto, as just stated, mechanism enabling the same to be fed in such manner as to present for action in regular succession the line of indicators pertaining to either pattern, and then at the required time to change to the other pattern and present the lines of indicators thereof for action in regular succession, the changes from one pattern to the other, and vice versa, being made whenever required by the exigencies of the work being done. We have shown in the accompanying drawings mechanism of this character and now will proceed to describe

such mechanism, after which we will define the nature of the invention and explain the manner of its application to said mechanism.

In the drawings, 1 is a supporting-framing. 2 is a shaft that is mounted in bearings 3 and 4 on the said framing.

5 is a sprocket-wheel or other suitable wheel loosely mounted on the said shaft 2 and driven in suitable manner, as by a sprocket-chain 51, Fig. 1.

6 is a clutch-hub mounted on the shaft 2 and caused to rotate therewith, but movable along the shaft toward and from the side of the sprocket-wheel aforesaid.

7 is a spiral spring surrounding the shaft 2 between the clutch-hub 6 and the bearing 3 and acting with a tendency to press the said clutch-hub into engagement with the sprocket-wheel 5.

8 is a hand-lever that is pivoted at 9 upon the framing 1, the said hand-lever having a forked inner end which engages in a groove that is provided in the clutch-hub, the said lever serving to enable the clutch-hub to be engaged with or disengaged from the sprocket-wheel 5, according as it is required that the shaft 2 shall be driven from the said sprocket-wheel or disconnected therefrom.

9 is the pattern-barrel for the harness-operating mechanism of a loom, around which is intended to pass in practice a pattern-chain of usual or suitable character and construction. The said pattern-barrel is operated from the shaft 2 by means of a worm 10, which is fast upon the said shaft, a worm-wheel 11, which is engaged and driven by the said worm, and intermediate devices which we shall describe as follows: The worm-wheel 11 rotates in unison with a short shaft 12, upon which it is mounted, the shaft 12 having mounted loosely thereon the two gear-wheels 13 and 14, of which that designated 13 is larger than that designated 14. Between these gear-wheels 13 and 14 a double-acting clutch-hub 15 is splined, the said gear-wheel and hub being constructed in usual manner to enable the said hub to engage with either of the said gear-wheels, according as the hub is moved in one direction or the other along the short shaft 12. The gear-wheel 13 meshes with a

gear-wheel 16 of half its diameter, that is fast upon the shaft 17 of the pattern-barrel 9, and the gear-wheel 14 meshes with a gear-wheel 18, which also is fast upon the shaft 17, the said gear-wheel 18 being of diameter equal to that of gear-wheel 14. When the clutch-hub is moved toward the gear-wheel 14, so as to clutch the latter to the shaft 12, each movement of the latter which is communicated thereto through shaft 2, worm 10, and worm-wheel 11 transmits through the gear-wheels 14 and 18 to the pattern-barrel 9 a movement of rotation of the same extent. When, however, the clutch-hub is moved in the other direction along the shaft 12 and is caused to engage with the gear-wheel 13, each movement of the shaft 12 transmits to the pattern-barrel a movement of rotation of twice the former extent. Thus the pattern-barrel and pattern-chain passing around the same may be fed or advanced either one line or bar of indicators at a time or two bars or lines at a time, according as the clutch-hub may be shifted. Two patterns having been set upon the pattern-chain, with the lines or bars of indicators pertaining to the one pattern arranged to alternate in regular succession with those of the other pattern, the parts will be caused to act so that so long as the weaving is to be conducted in accordance with one pattern the large gear-wheel 13 shall be clutched fast to shaft 12, whereby the pattern-barrel and pattern-chain shall be fed or advanced two lines or bars of indicators at a time, thereby presenting the alternate lines or bars of indicators of the pattern-chain successively in position for action, as is required in order to skip the intermediate lines or bars of indicators which pertain to the other pattern. When now a shift is to be made from one pattern to the other, it is necessary only to disengage the clutch-hub 15 from gear-wheel 13 and move it into engagement with gear-wheel 14. By means of the latter and gear-wheel 18 a movement is transmitted to the pattern-barrel sufficient to feed or advance the pattern-barrel and pattern-chain only to the extent of one line or bar of indicators. This advancement of the pattern-chain presents in position for action, as will be understood, one of the lines or bars of indicators which, being intermediate those which formerly were brought into action, pertain to the other pattern. The change from one pattern to the other thus having been effected in this manner, the clutch-hub is disengaged from the gear-wheel 14 and caused to reengage with the gear-wheel 13, whereby the pattern-barrel and pattern-chain are actuated, as before, two lines or bars of indicators at a time, presenting for action only those pertaining to the second pattern. The return to the pattern first in use is effected in the same manner.

For the purpose of operating the clutch-hub 15 a shifter 19 is provided. The said shifter is shown as constituted by a lever one end of

which is provided with a pin 20, entering a groove 21 in the clutch-hub. By moving this lever in one direction or the other the clutch-hub is shifted into engagement with one or the other of the gear-wheels 13 14 upon the shaft 12. In order to hold the clutch-hub normally in engagement with the gear-wheel 13, a spring 22 is connected to the said lever, as shown. For the purpose of shifting the clutch-hub out of engagement with the gear-wheel 13 and into engagement with the gear-wheel 14 the shifter 19 is connected by a rod 32 with the upwardly-extending arm 311 of a finger or lever 31, the said finger or lever 31 having a horizontal arm which extends over the pattern-chain 23 and is acted upon by indicators thereon. The pattern-chain 23 pertains to the shuttle-box-operating mechanism. At 24 is the pattern-barrel, around which the said pattern-chain 23 passes. At 25 is the shaft upon which the said pattern-barrel is made fast. At 26 is a worm-wheel upon the said shaft 25, and at 27 is a worm engaging with the said worm-wheel to rotate the shaft 25 and barrel 24 in order to feed the pattern-chain 23. At 28 is a shaft upon which the said worm is mounted, the said shaft 28 being driven from the shaft 2, hereinbefore mentioned, by means of the beveled gears 29 and 30. When, through the movement of the finger or lever 31 which is occasioned by a riser on the shuttle-box pattern-chain, the arm 311 is carried toward the right in the drawings, the shifter 19 is operated to carry the clutch-hub 15 into engagement with the gear-wheel 14. When the said arm 311 is free to return toward the left, the shifter is returned by its spring 22 and replaces the clutch-hub in engagement with the gear-wheel 13. As will be observed, the gear 30 on the shaft 28, which drives the shuttle-box pattern-barrel, is twice the diameter of the gear 29 on the shaft 2. From this it results that the pattern-barrel 9 for the harness-operating mechanism is advanced twice for every advance of the pattern-barrel 24 for the shuttle-box-operating mechanism. This proportion of the gears 29 and 30 is that which is employed when the pattern-barrel 9 is employed in connection with what is termed a "single-index dobby," and where there is employed in the loom a shifting or change shuttle-box on but one side of the latter. In a single-index dobby each bar of the pattern-chain has applied thereto only the indicators which pertain to a single shed of the warps, and hence the pattern-barrel 9 has to be advanced one step at each pick of the loom. When the shifting or change shuttle-box is employed at one side of the loom only, the pattern-barrel therefor is advanced a step only after every two picks of the loom, as required in order to enable the shuttle to be picked across and then returned to the proper cell of the change shuttle-box before the latter is altered in position. Inasmuch as the pattern-barrel 24 for the shuttle-boxes is advanced only after

every second pick, while the shaft 2 operates through the described connections to advance the pattern-barrel 9 one step at every pick, it is necessary to provide some arrangement by means of which, for one of the two picks which occur after each movement of the pattern-barrel 24 of the shuttle-boxes, the finger 31 is disconnected from the shifter 19. As has been pointed out herein and as will be obvious, it is necessary in shifting from one pattern to the other by the aid of mechanism substantially such as that which has been explained to shift the pattern-barrel 9 simply to the extent of one step. It also will be obvious that the clutch-hub 15 must not be left in engagement with the gear 14 during two movements of the shaft 2. If it is, a second advance of one step will be given to the pattern-barrel 9, and thereby a line of the pattern formerly at work will be brought into position for action.

It is the special aim of our invention to provide means for preventing the clutch-hub from remaining in engagement with the gear 14 for more than one pick, notwithstanding the pattern-barrel 24 is moved only at every other pick. To this end we combine with the finger or lever 31 and with the shifter 19 safety devices such as we now shall proceed to describe, whereby, after the shifter 19 has been operated, by the action of a riser on the shuttle-box pattern-chain 23 upon the finger or lever 31, to carry the clutch-hub 15 into engagement with the gear 14, and after the pattern-barrel 9 has been advanced to the extent of one step, the shifter automatically shall be released and permitted to disengage the clutch-hub 15 from the gear 14 and reengage it with gear 13. By this means, although for another pick the riser aforesaid, which was brought under the horizontal arm of the finger or lever 31 by the last movement of the shuttle-box pattern-chain 23, remains under the said horizontal arm, the clutch-hub is permitted to become disengaged from the gear 14 and permitted to become reengaged with gear 13 without waiting for the said riser to pass from under the said horizontal arm of the finger or lever 31, and the presentation of the desired pattern is not interfered with.

Our preferred form of safety devices is shown in the drawings and consists as follows: The arm 311 of the pattern finger or lever 31 is pivotally connected with the main portion of the said lever, as shown most clearly in Figs. 3 and 4. To said arm 311 of lever 31 is applied a coupling device, which in the present instance comprises a bell-crank 312, which latter is pivoted at 313 to the said arm 311. The said bell-crank has a short arm 314, which arm is adapted to engage with a shoulder 315 on the main portion of the pattern finger or lever 31, as shown in Fig. 3. A spring 316, connected with said bell-crank, tends to hold said arm thereof in engagement with the said shoulder, as indicated in Fig. 3. One end of this spring is connected with the bell-crank

and the other to the upper part of the arm 311. With the bell-crank 312 is connected one end of a cord or connector 317, the other end of which is attached to a bell-crank 318, which latter is mounted pivotally upon a fixed support, as shown. One arm of this bell-crank 318 extends over the shaft 2 in position to be acted upon by a cam 319, which is fixed upon the said shaft. In each revolution of the said shaft the cam acts upon the bell-crank 318 and, through the cord or connection 317, swings the bell-crank 312 into the position which is represented in Fig. 4. So long as the bell-crank 312 is held in engagement with the shoulder on the main part of the pattern finger or lever 31, as in Fig. 3, the arm 311 and the main part of the pattern finger or lever move rigidly together, and if under such condition a riser on the shuttle-box pattern-chain should be advanced under the horizontal arm of the pattern finger or lever 31 the parts will move as one and will serve to transmit to the shifter 19, through the connections described, the movement by means of which the clutch-hub 19 is placed temporarily in engagement with the gear 14.

As hereinbefore indicated, the shuttle-box pattern barrel and chain remain without further movement during two picks of the loom, but instead of the shifter 19 remaining under the control of the riser aforesaid, which has been brought under the horizontal arm of the pattern finger or lever 31, throughout the time required for making two picks the cam 319 on the shaft 2 comes around soon after the engagement of the clutch-hub 15 with the gear 14, and after the pattern-barrel 9 has been advanced to the extent of one step and by acting upon the bell-crank 318 disengages the bell-crank 312 from the projection aforesaid on the main portion of the pattern finger or lever 31, as shown in Fig. 4, rendering the arm 311 free to move relatively to the said main portion of the pattern lever or finger and allowing the spring 22 to act to draw the shifter 19 and clutch-hub 15 back into the position which is represented in Figs. 1, 2, and 3, thereby disengaging the clutch-hub from the gear 14 and reengaging it with the gear 13. When the riser passes out from under the horizontal part of pattern finger or lever 31, such part descends, but the rod 32 holds the upper end of arm 311 from partaking of the movement. The turning of the said arm upon the pivot which connects it with the pattern finger or lever 31 raises the lower end of arm 314 of the coupling bell-crank 312 above the shoulder 315. When this occurs, the spring 316 turns the bell-crank into the locking position which is shown in Fig. 3, where it engages with shoulder 315 again.

We claim as our invention—

1. In combination, the pattern-barrel 9, an actuating-shaft as 12, separate trains of driving-gearing whereby to communicate from the said shaft to the said pattern-barrel movements of different extent, a clutch to render

either of such trains operative to move the said pattern-barrel as desired, and pattern devices controlling the said clutch and determining which of the said trains of driving-gearing shall be made operative to actuate the pattern-barrel, substantially as described.

2. In combination, the pattern-barrel 9, separate trains of driving-gearing whereby to communicate to the said pattern-barrel movements of different extent, a clutch to render either of such trains operative to move the said pattern-barrel as desired, a spring operating to shift the clutch in one direction, the shuttle-box pattern-barrel, the shuttle-box pattern-chain, a finger or lever actuated by indicators on the said pattern-chain a movable piece having operative connections with the clutch, a coupling device whereby to cause said movable piece to move in unison with said finger or lever, and thereby shift the clutch in opposition to the spring, and releasing devices whereby to disengage said coupling device and thereby render the said movable piece free to move relatively to the finger or lever to allow the spring to act, substantially as described.

3. In combination, the shaft 2, the pattern-

barrel 9, separate trains of driving-gearing intermediate the said shaft and pattern-barrel, whereby to communicate to the said pattern-barrel movements of different extent, a clutch to render either of such trains operative to move the said pattern-barrel as desired, a spring operating to shift the clutch in one direction, the shuttle-box pattern-barrel, the shuttle-box pattern-chain, the finger or lever 31 actuated by indicators on the said pattern-chain, the arm movably connected with the said finger or lever, means to connect the said arm to the clutch, the bell-crank to couple said arm rigidly to said finger or lever, the spring whereby said bell-crank is held normally in locking position, a cam on shaft 2, a movable piece operated by the said cam, and connections from said movable piece to the bell-crank to effect the uncoupling of the movable arm, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

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ALONZO R. PATTEN.

Witnesses:

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