(No Model.)

O. ARNOLD.

MECHANICAL MOVEMENT.

No. 315,883. Patented Apr. 14, 1885.

Fig. 1

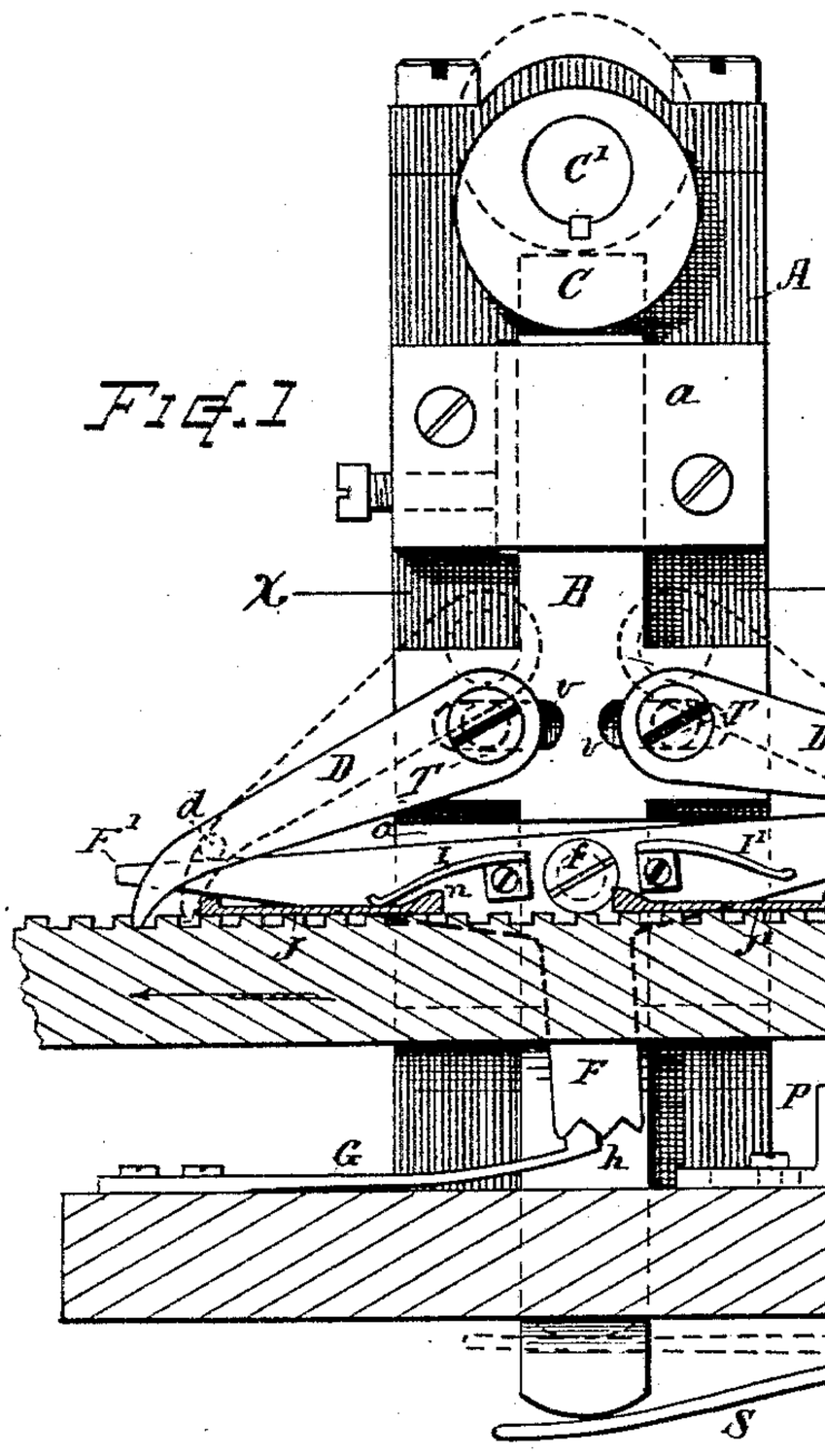


Fig. 2

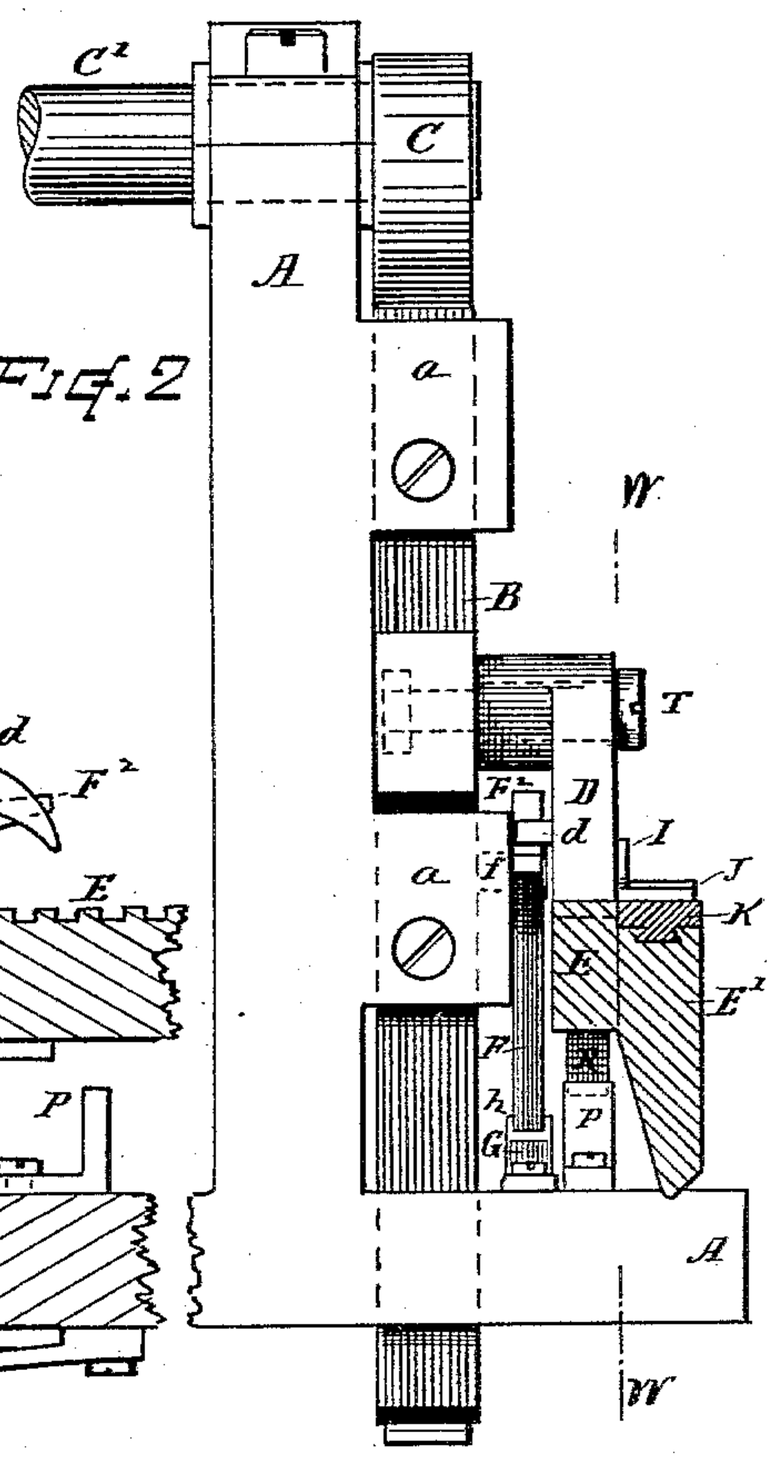


Fig. 5

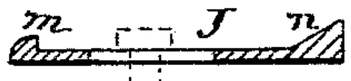


Fig. 3

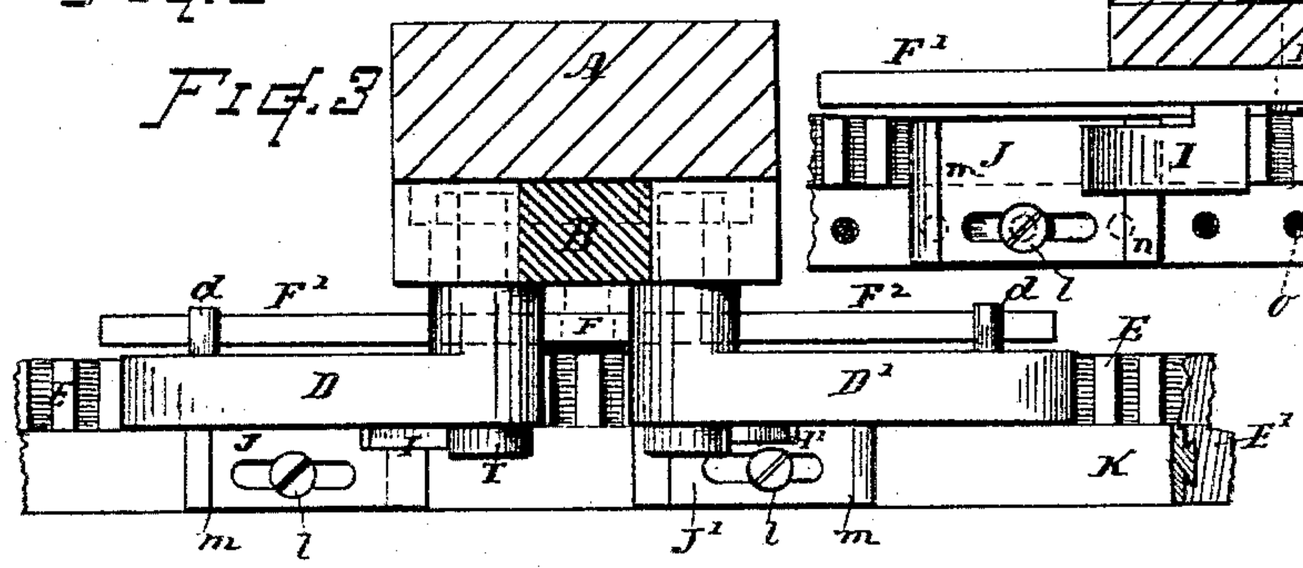
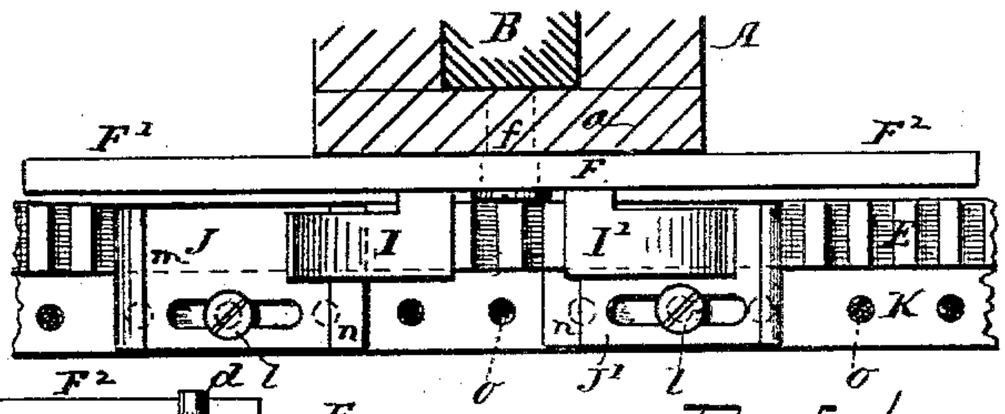


Fig. 4



WITNESSES.

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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 315,883, dated April 14, 1885.

Application filed January 30, 1885. (No model.)

To all whom it may concern:

Be it known that I, OLIVER ARNOLD, 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 Mechanical Movements; and I declare the following to be a description of my said invention sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The object of my present invention is to provide mechanism for converting a regular rotary or a reciprocating movement into an intermittent lateral movement, operative in one direction for a number of steps or beats, and then reversing and operating in like manner in the opposite direction, the mechanism being applicable for action in straight linear direction, as on a rack, bar, or slide, or in curvilinear direction, as on the periphery face or side of a wheel or segment.

My invention consists in mechanism organized for operation as herein shown and described.

In the drawings, Figure 1 is a part front part sectional view at line *w w* of a mechanism illustrative of the nature of my invention. Fig. 2 is a side view of the same, the rack-carrier and slide being shown in section. Fig. 3 is a horizontal section at line *x x*. Fig. 4 is a horizontal section at a position below the pawls, and Fig. 5 is a section through one of the shoes or trip-dogs.

In reference to the several parts on the drawings, A denotes the supporting-frame. B indicates a reciprocating bar or plunger, movable in bearings or guides *a a* on said frame, and actuated, in the present instance, by a cam, C, on a rotating shaft, C′, and a return-spring, S, at the opposite end of said bar. Any other suitable means can be employed in lieu of the cam C for reciprocating the plunger-bar B, if more convenient in the situation where this mechanism is employed.

D and D′ indicate pawls pivoted on the plunger-bar B and extending outward to the right and left, respectively, the points or ends thereof being fitted to engage with notches or teeth on the laterally-movable rack, ratchet, or gear E, in connection with the carrier E′, or operated parts.

F indicates a yoke or oscillating tumbler-piece, centrally pivoted at *f* on a stationary part of the frame, and provided with laterally-extended arms F′ F², that engage with pins or lugs *d* on the pawls, for raising one or the other of said pawls from the teeth of the gear or ratchet E accordingly as said tumbler is thrown to the right or left. A spring, G, engaging with the tumbler by suitable lugs and notches, as at *h*, serves to temporarily retain the parts with either of the pawls elevated, while permitting the oscillation or shifting of the tumbler from right to left position, or vice versa, by the trip devices.

I and I′ indicate trip-plates secured to the tumbler F and extending over the gear E, with downward-inclined ends placed in right-and-left arrangement. These trip-pieces I are preferably made as springs, although in some instances they might be made rigid, if desired.

J and J′ indicate trip dogs or shoes attached to the ratchet-gear or to a slide, K, mounted adjacent thereto upon the carrier E′, which supports the ratchet, and which slide is permitted to have movement independent of the ratchet E in directions parallel with the movements of the ratchet. The trip-dogs extend over the teeth of the rack or gear and are provided with a lug or notch, as *m*, suitable for engagement with the end of the pawl, and with an incline or lug, as *n*, suitable for engaging and elevating the trip-plate in connection with the tumbler-arms. The dogs are secured by screws *l*, that pass through slots in their plate and screw into holes *o* in the slide-bar, or otherwise attached in connection with the ratchet. The dogs are adapted for adjustment to different positions along the ratchet or slide for tripping the pawls and reversing the direction of motion of the carrier E′ at such intervals as may be desired.

P P and R are adjustable stops to be placed at the limits of the movement of the ratchet and carrier E′.

The operation of my improved mechanism is as follows: The bar moves with a regular reciprocating action as the cam C revolves. As the bar rises (see dotted lines, Fig. 1) the

points of the pawls are drawn inward, and the pawl D, which is not held up by the tumbler or yoke, engages with a tooth of the gear or ratchet E. Then, as the bar B descends, the points of the pawls are forced outward (see position in full lines, Fig. 1) and the engaging-pawl D forces forward the ratchet and carrier one step in the direction in which that pawl works. This action is repeated at each beat of the plunger until the trip dog or shoe J is brought beneath the toe of the pawl D, which, in its next action catches the lug or notch *m*, and as the pawl presses forward, moving the dog, the incline *n* is drawn beneath the end *i* of the plate I, so that the latter is raised with sufficient force to overcome the resistance of the spring G, and the tumbler F is oscillated or thrown over into opposite inclination, its arms F′ raising the pawl D and its arm F^2 permitting the pawl D′ to drop into engagement with the gear-teeth, thus reversing the mechanism, so that the next and succeeding strokes will work the ratchet and carrier in the opposite direction until the dog J′ is brought beneath the toe of the pawl D′, when the mechanism will be in like manner again reversed, thus effecting the intermittent movement of the carrier E′, and any apparatus connected therewith, a number of steps in one direction and then reversing and giving a number of steps in the opposite direction, and so on alternately. The slide-bar K allows the dogs to be moved forward independently by the pawl engaging the lug *m*, while the ratchet and carrier are held by the stops P and R. This allows a rest of the carrier one stroke between the reverse actions of the ratchet. If the slide K is held rigid with the ratchet, or the dogs fixed directly to the gear or toothed piece, the reversal would be immediate or without the skip of a stroke. In this case the stops P and R would not be required. Again, if the slide K, carrying the dogs J J′, is moved forward faster than the gear E by any convenient means, or retarded during the action of the pawls, the intervals of reversal of the motion can be varied or governed according to the movement of the slide K.

The mechanism is herein shown as adapted for operating the carriage in a machine for setting teeth in card-clothing, the intermittent actions giving the spacing for the teeth back and forth across the fabric or leather. It will be understood, however, that the mechanism is applicable and may be employed for converting motion in other kinds of machinery.

The pivots or studs T, on which the pawls D D′ are hung, may be set in laterally-disposed slots *v* in the bar B, so as to permit lateral adjustment of the pawls to match the spacing of the teeth on the ratchet or gear E, that there may be no backlash or loss of movement when reversing the action from one pawl to the other.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. The combination of the reciprocating bar B, the pawls D D′, the ratchet or gear E, the tumbler F, having arms F′ F^2, and trip-plates I I′, and the trip-dogs J J′, substantially as and for the purposes set forth.

2. The oscillating tumbler F, springing trip-plate I, and dog J, having the lug *m* and incline *n*, in combination with the pawl D and ratchet-gear E, for the purposes set forth.

3. The combination of the reciprocating plunger B, carrying the pawls D D′, the ratchet or gear E, the tumbler F, the elastic trip-plates or springs I I′, slide-bar K, stops P R, and adjustable dogs J J′, substantially as set forth.

4. The combination of the plunger B, the pawls D D′, laterally adjustable thereon, the rack or gear E, the tumbler F, with arms F′ F^2, and trip-plates I I′, the spring G, carrier E′, slide K, adjustable dogs J J′, cam C, and springs, as shown and described.

Witness my hand this 21st day of January, A. D. 1885.

OLIVER ARNOLD.

Witnesses:

CHAS. H. BURLEIGH,

CLARKE JILLSON.