No. 728,226. PATENTED MAY 19, 1903.

R. F. HARGRAVES.

MECHANICAL MOVEMENT.

APPLICATION FILED JULY 31, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

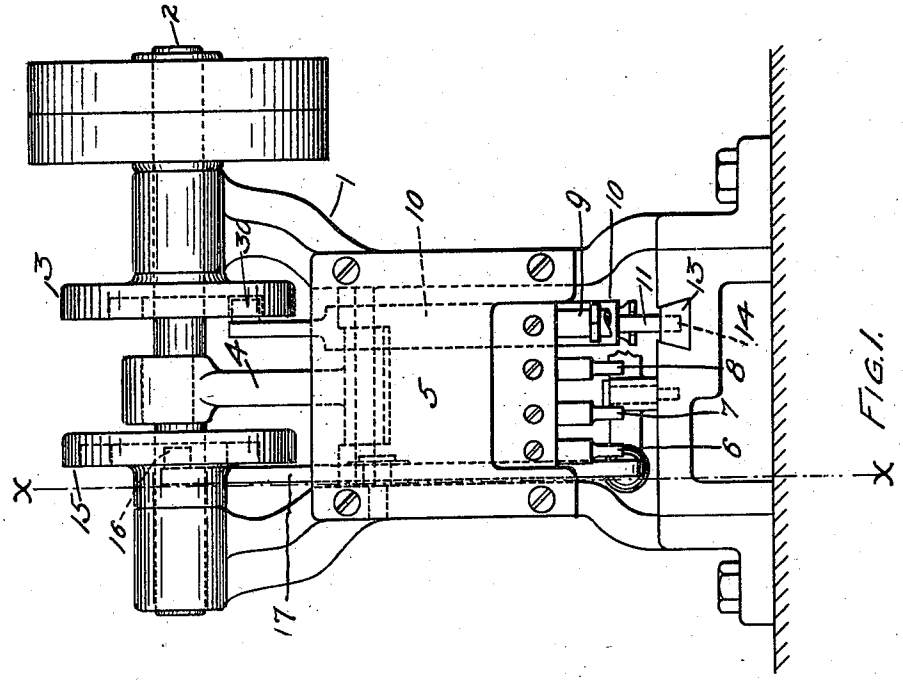


FIG. 1.

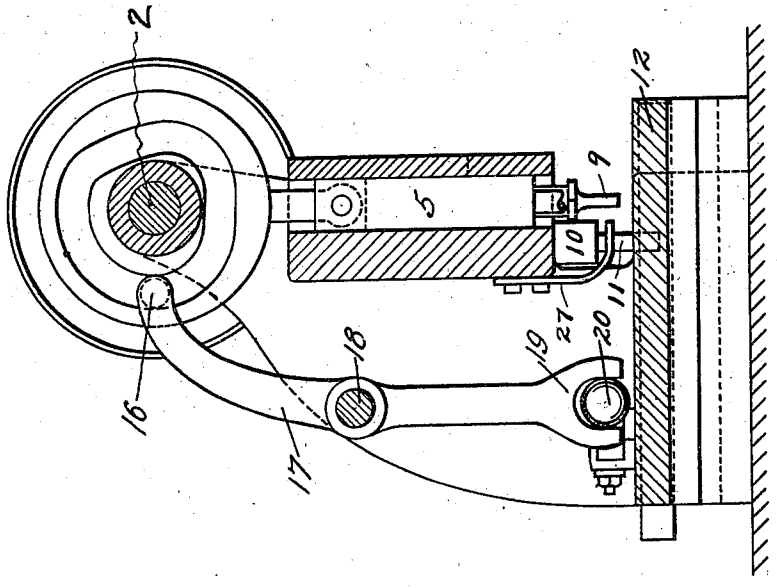


FIG. 2.

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NO MODEL. 2 SHEETS—SHEET 2.

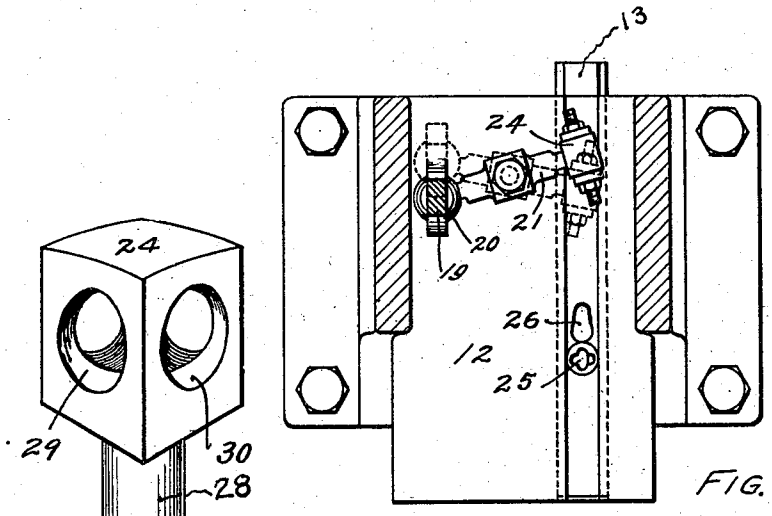


FIG. 3.

FIG. 6.

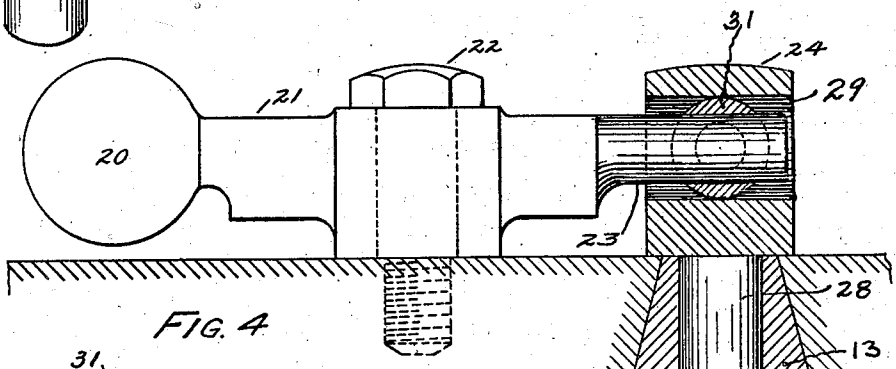


FIG. 4.

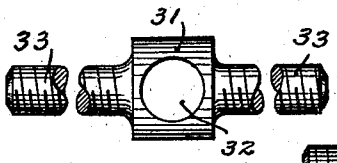


FIG. 7.

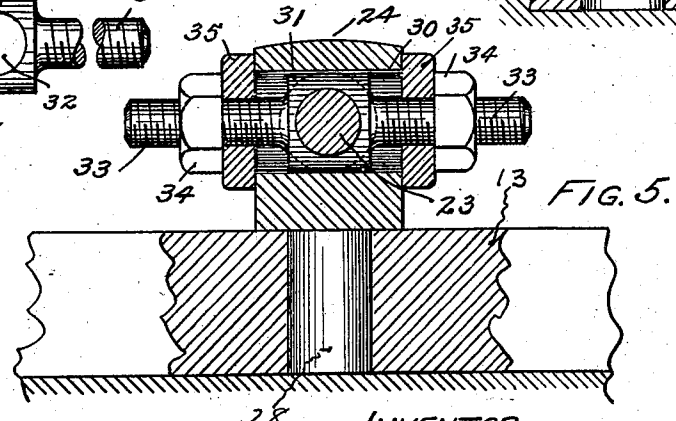


FIG. 5.

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No. 728,226. Patented May 19, 1903.

UNITED STATES PATENT OFFICE.

ROBERT F. HARGRAVES, OF PROVIDENCE, RHODE ISLAND.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 728,226, dated May 19, 1903.

Application filed July 31, 1902. Serial No. 117,767. (No model.)

To all whom it may concern:

Be it known that I, ROBERT F. HARGRAVES, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

My invention relates to mechanism for reciprocating a die-carrier or similar machine element and for adjusting the same. It is particularly adapted for use upon machines employed to manufacture lacing-stud hooks. Its object is to furnish a simple and novel means for converting continuous rotary motion into reciprocating rectilinear motion including improved adjusting means, and when embodied in a machine of the type above mentioned its purpose is to provide a means for reciprocating and adjusting the die-carrier.

To these ends my invention consists in the novel arrangement and combination of parts hereinafter described, and illustrated in the accompanying drawings, wherein—

Figure 1 is a front elevation of a common form of lacing-stud-hook machine containing my invention; Fig. 2, a vertical section of the same on line *x x* of Fig. 1; Fig. 3, a plan view of the machine bed-plate with my adjusting device attached thereto; Fig. 4, a side elevation of the pivoted lever slidably engaged with the stud member, the latter being in transverse central section; Fig. 5, a longitudinal central section of the stud member with parts in side elevation, and Figs. 6 and 7 are detail views of certain of the stud parts.

Like reference-numerals indicate like parts throughout the views.

I describe my invention in connection with the usual form of lacing-stud-hook machine, the essential features of which are as follows: In a frame 1 is mounted a driving crank-shaft 2, carrying a grooved cam 3, and upon the crank the arm 4, pivoted to a vertically-sliding head 5, the lower end of which carries plungers 6, 7, 8, and 9. The cam 3 engages the roller 30, projecting from the upper extremity of the former-stock 10. The latter carries the usual former 11, which is immediately in the rear of and in alinement with the punch 9. Let into the bed-plate 12 is a longitudinally-movable block 13, carrying in its upper face a die 25, having an irregularly-shaped opening with which the punch is adapted to register. Immediately in the rear of the die the carrier-block is traversed by an opening 26, through which the completed lacing-stud hook falls when forced by the stripper 27 from the former 11, as will be later detailed. The operation of this familiar mechanism is substantially thus: The metallic strip from which the hooks are to be cut is fed by hand or by an automatic attachment transversely across the bed-plate beneath the punches 6, 7, 8, and 9, which score, indent, and cut the oblong hook-blank from the strip, the final cutting operation being performed by the punch 9 in its downward stroke upon the die 25. While the punch 9 rises for a return stroke the carrier-block slides rearward until the die, with its oblong blank, is beneath the former 11, which then descends, completing the hook by bending the dome thereof over its shank. Since the bent hook still adheres by friction to the rising former, the hook is removed therefrom by a stripper 27, while the carrier-block continues its retreat to bring its passage 26 underneath the former 11 to receive the hook stripped therefrom. The carrier-block then advances the die 25 to its original position beneath the punch 9. My invention is exclusively addressed to the means of attaining this regular longitudinal reciprocatory movement of the carrier-block and the adjustment of the same. Experience has shown that this reciprocation, however attained, so wears the working parts of the machine that unless adjusted in some manner to compensate for the wear the carrier-block will ultimately fail to leave its die in vertical alinement with the punch 9, which, it is needless to state, ruins the blank.

The mechanism which I have devised for obtaining the desired end is the following: Mounted upon the driving crank-shaft 2 is a grooved cam 15, which engages a roller 16 upon the upper extremity of an upright lever 17, which is pivoted near its center 18 and embraces in its forked lower extremity 19, which resembles a socket, a ball 20. This ball forms one extremity of a lever 21, pivoted intermediate its ends to the bed 12 by means of a bolt 22. The end of the lever 23 oppo-

site the ball is reduced in diameter and preferably cylindrical. This end is slidably engaged with the stud 24, which is pivoted by a smooth shank 28 in the upper face of the carrier-block 13. The body of the stud is substantially the shape of a cube, traversed by a circular transverse passage 29 and a longitudinal passage 30, intersecting the former opening. The opening 29 is of somewhat greater diameter than the lever end 23, which traverses the same. Slidably mounted in the passage 30 is a cylindrical bar consisting of an enlarged body portion 31, with a transverse circular opening 32, sufficiently large to admit the lever end 23 to slide therethrough. Both ends 33 of this bar are threaded to engage nuts 34, which secure washers or blocks 35 to the ends of the stud-body and serve to longitudinally adjust the threaded bar. The movement of the carrier-block is therefore reciprocating and rectilinear, which movement is produced as follows: The rotation of the grooved cam 15 imparts, through the roller 16, a vibratory action to the fork 19 of the lever 17, which in turn oscillates the lever 21, whose extremity reciprocates the carrier-die 13 through the stud 24. It will be observed that as the stud 24 is pivoted it will at all times be at right angles to the oscillating lever 21, but will alternately slide to and fro upon the reduced end 23 of the oscillating lever, being at the greatest distance from the pivoting-bolt 22 at the extremes of travel of the carrier-die. If the wear of the machine parts make readjustment of the reciprocatory travel of the carrier-die necessary, it is effected by turning the nuts 34 upon the ends 33 of the cylindrical bar, whereby the latter assumes a new position longitudinally.

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

1. In a mechanism for imparting reciprocating rectilinear motion to a slidable object, the combination with a pivoted lever of means for oscillating said lever, a second pivoted lever oscillated by the first lever, a pivoted stud slidably engaging the second lever, and a slidable object in which the stud is pivoted.

2. In a mechanism for imparting reciprocating rectilinear motion to a slidable object the combination with a driving-shaft of a grooved cam mounted thereon, a roller rotating in the grooved cam, and mounted upon one end of a pivoted lever, a pivoted lever, and means upon the other end of said pivoted lever for engaging a spherical lever-terminal, a second pivoted lever provided with the spherical terminal and having a smooth free terminal, a pivoted stud in which the free terminal reciprocates, and a slidable object in which the stud is pivoted.

3. As a new mechanical movement, the combination of a body portion traversed by two passages intersecting at right angles to each other, a threaded bar, provided with a transverse opening, longitudinally adjustable in one of the passages, and means for fixing the threaded bar at any point in its longitudinal movement.

4. As a new mechanical movement, the combination of a body portion traversed by two intersecting passages, a bar slidably mounted in one of said passages and provided with a transverse opening concentric with the other of said passages and means for adjusting the bar longitudinally.

5. As a new mechanical movement, the combination of a body portion traversed by two passages intersecting at right angles to each other, a bar slidably mounted in one of said passages and provided with a transverse opening concentric with the other of said passages and means for adjusting the bar longitudinally.

6. As a new mechanical movement, the combination of a body portion traversed by two intersecting passages, a bar slidably mounted in one of said passages and provided with a transverse opening concentric with the other of said passages, but of lesser diameter than the latter, and means for adjusting the bar longitudinally.

7. As a new mechanical movement, the combination of a body portion traversed by two intersecting passages, a threaded bar slidably mounted in one of said passages and provided with a transverse opening concentric with the other of said passages, and means for adjusting the bar longitudinally.

8. As a new mechanical movement, the combination of a body portion traversed by two intersecting passages, a threaded bar slidably mounted in one of said passages and provided with a transverse opening concentric with the other of said passages, and adjusting-nuts engaging the threaded bar.

In testimony whereof I have affixed my signature in presence of two witnesses.

ROBERT F. HARGRAVES.

Witnesses:
HORATIO E. BELLOWS,
WILLIAM C. STANTON.