(No Model.)

J. A. FENNELL.

MECHANICAL MOVEMENT.

No. 455,248. Patented June 30, 1891.

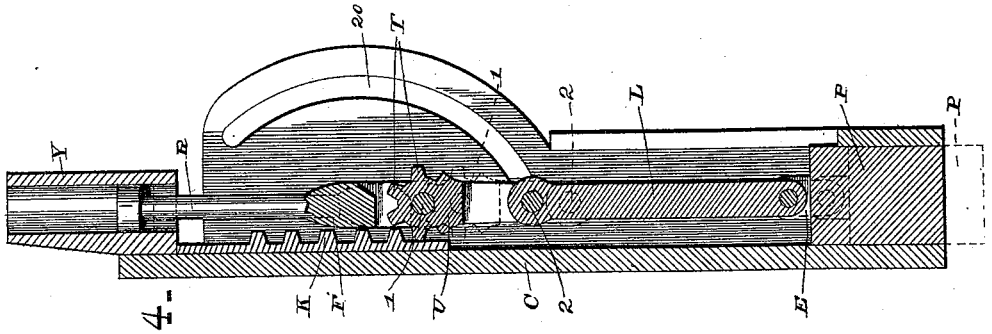

FIG. 4.

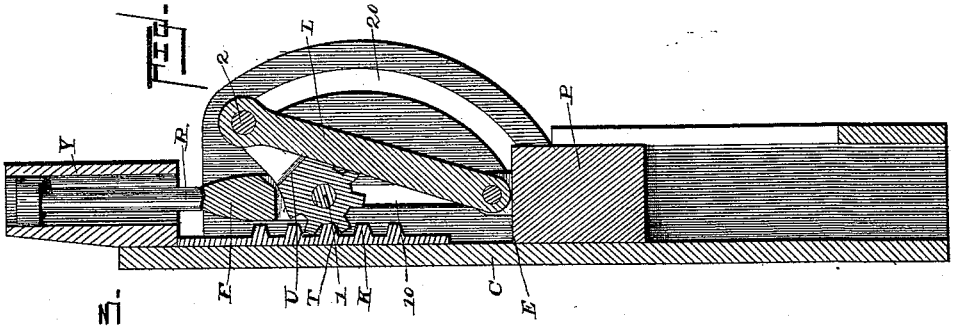

FIG. 3.

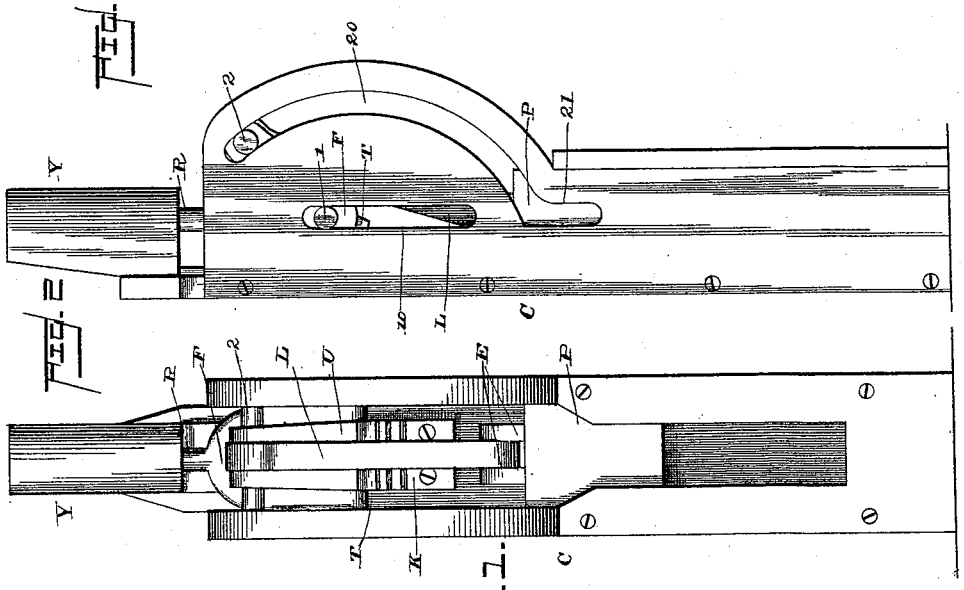

FIG. 2.

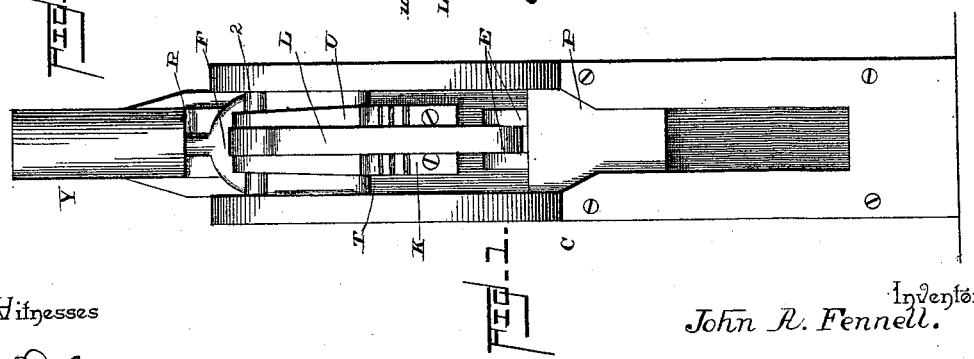

FIG. 1.

Witnesses

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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 455,248, dated June 30, 1891.

Application filed January 28, 1891. Serial No. 379,407. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. FENNELL, a citizen of the United States, residing at Bradenville, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Mechanical Movement, of which the following is a specification.

This invention relates to machine elements, and more especially to the racks and pinions included therein.

The object of the invention is to provide an improved movement adapted more especially for application to the plungers of presses or to other similar positions in machinery where it is desired that the power imparted by a piston driven by a fluid shall be positively communicated to the plunger-head in such manner as to cause the latter to move, first swiftly, and finally, when the greatest resistance occurs, at the same speed as said piston.

To this end the invention consists of the mechanical movement hereinafter described and claimed, the same embracing a toggle-lever driven by a rack and pinion, all of the more particular arrangement set forth below, and illustrated on the sheet of drawings, wherein—

Figure 1 is a front elevation, Fig. 2 a side elevation, and Fig 3 a central vertical longitudinal section, of this device with the plunger-head raised. Fig. 4 is a similar section showing the device in full lines at the moment the positive stroke commences and in dotted lines at the moment of its completion.

Referring to the said drawings, the letter C designates a suitable casing, within whose lower end reciprocates in the present instance a plunger-head P, and at whose upper end is located in the present instance a cylinder Y, within which moves a piston-head of the ordinary construction, as will be clearly understood. Extending from this piston-head downwardly into the casing is a piston-rod R, having a fork F at its lower end, and pivoted within this fork is a U-shaped link U, the pivot-pin 1, connecting these members, extending transversely and moving within slots 10 in the sides of the casing C.

The letter L designates a connecting link or pitman pivoted at its lower end between ears E on the plunger and at its upper end between the feet of said U-shaped link U, the pivot-pin 2, connecting these members, extending transversely and moving within curved slots 20 in the sides of the casing C, each of said slots having an extension 21 at its lower end in alignment with the slot 10 above.

The letter K designates a rack-bar secured within and to the rear face of the casing, and T are teeth projecting from the head of the link U and engaging the teeth of said rack-bar. The piston being moved downwardly by any suitable power, the rod R and fork F are correspondingly moved, the pin 1 moving in the slots 10. The teeth T move over those in the rack-bar K, and the link U is thereby given a positive movement around its pivot 1, the pivot-pin 2 in the outer end of said link moving through the curved slots 20, as will be obvious. As soon as this pin has moved through the length of the curved portions 20 of these slots to the position shown in full lines in Fig. 4 it will be obvious that the rod R, link U, and pitman L stand in direct alignment, and further movement of the rod by the piston will be imparted directly and forcibly to the plunger. Hence it will be seen that throughout the first portion of the downward movement of the piston such movement is converted by the engagement of the teeth T with the rack K into a rapid movement of the plunger; but as soon as the parts get into alignment, at which time said teeth and rack-bar disengage, the conversion of the motion ceases and it is directly communicated to the plunger. The return or upward movements of the parts will of course correspond.

By the use of a device of this character a short but powerful movement of the rod R may be utilized to drive the plunger P, first swifty through a considerable distance, and then slowly and very powerfully through the balance of its stroke. If, therefore, the piston be moved by hydraulic or pneumatic pressure and the plunger be the plunger-head of a hay or other press, it will be obvious that a short movement of the piston will effect exactly the operation of the plunger-head which is desirable. I do not, however, limit myself to the use of this device in connection with a press, although I have thus described its application, as it is obviously applicable to hoist-

ing devices as well as to various other points where a machine element of this character will be useful; and even by a slight change in structure, as the omission of the straight portions 21 of the slots 20, the device could be used in a pile-driver or in other locations where a hammer action was desirable.

The advantage of this device is that it converts a slow but powerful movement into a swift one, but terminating in a short stroke of the same speed as said powerful movement, and all this is done in a positive manner, not depending upon the movements of pivoted arms, as in an ordinary toggle-lever.

What is claimed as new is—

1. The herein-described mechanical movement, the same comprising a casing having a rack-bar secured therein and having longitudinal slots in its sides, a piston-rod having a forked lower end, a link pivoted in said fork and having teeth on its head engaging said rack-bar, the ends of the pivot-pin moving in said slots, a pitman pivotally connected to said link at its other end, and a plunger connected with the pitman, as set forth.

2. The herein-described mechanical movement, the same comprising a casing having a rack-bar therein and having in its sides straight longitudinal slots and curved slots, a piston-rod having a forked lower end, a U-shaped link pivoted in said fork and having teeth on its head engaging said rack-bar, the ends of the pivot-pin moving in said straight slots, a pitman pivoted between the feet of said link, the ends of this pivot-pin moving in said curved slots, and a plunger pivotally connected with the other end of the pitman, as set forth.

3. The herein-described mechanical movement, the same comprising a casing having a rack-bar therein and having in its sides straight longitudinal slots extending slightly below the lower end of said rack-bar and curved slots extending over said straight slots and having straight extensions at their lower ends in alignment with the straight slots, a piston-rod having a forked lower end, a U-shaped link, its head pivoted in said fork and having teeth thereon engaging the rack-bar, the ends of the pivot-pin moving in said straight slots, a pitman, one of whose ends is pivoted between the feet of said link, the ends of this pivot-pin moving in said curved slots and their extensions, and a plunger pivotally connected with the other end of the pitman, as set forth.

4. The herein-described mechanical movement, the same comprising a casing having a rack-bar therein and having in its sides curved slots, a piston-rod having a forked lower end, a U-shaped link, its head pivoted in said fork and having teeth engaging the rack-bar, a pitman, one of whose ends is pivoted between the feet of said link, the ends of the pivot-pin moving in said curved slots and their extensions, and a plunger pivotally connected with the other end of the pitman, as set forth.

5. The herein-described mechanical movement, the same comprising a casing having a rack-bar therein and provided with curved slots in its sides having straight extensions at their lower ends, a piston-rod having a forked lower end, a U-shaped link with its head pivoted in said fork and having teeth engaging the rack-bar, a pitman, one of whose ends is pivoted between the feet of said link, the ends of the pivot-pin moving in said curved slots and their extensions, and a plunger pivotally connected with the other end of the pitman, as hereinbefore set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOHN A. FENNELL.

Witnesses:
GEO. DE LANEY,
M. E. FENNELL.