(No Model.)

W. S. CARLISLE.

MECHANICAL MOVEMENT.

No. 317,723. Patented May 12, 1885.

Fig. 1.

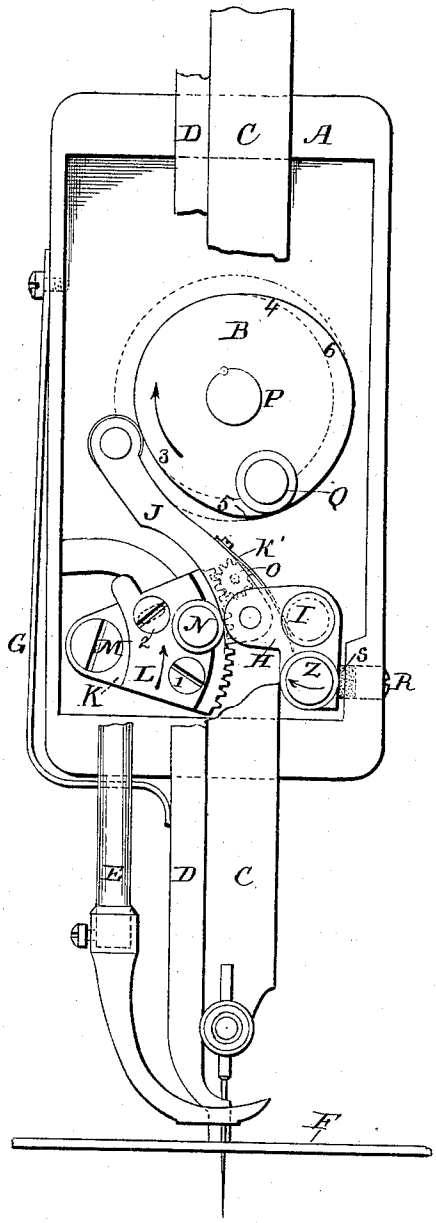
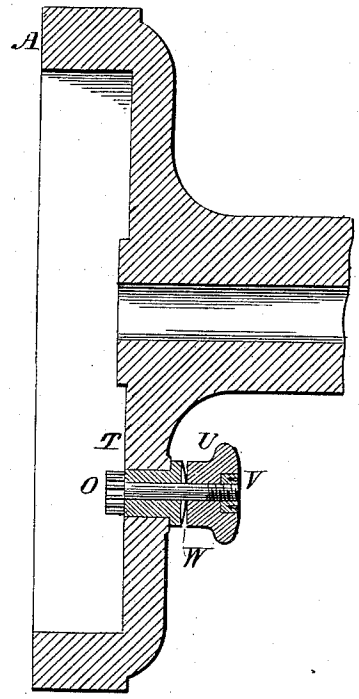


Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM S. CARLISLE, OF WATERTOWN, NEW YORK, ASSIGNOR TO THE DAVIS SEWING MACHINE COMPANY, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 317,723, dated May 12, 1885.

Application filed November 15, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. CARLISLE, of Watertown, in the county of Jefferson and State of New York, have invented a new and useful Improvement in Mechanical Movements, which improvement is fully set forth in the following specification.

This invention has reference to a new mechanism for imparting a variable or adjustable stroke from a cam. The mechanism belongs to that class in which the cam acts upon a lever whose fulcrum is adjustable lengthwise of the same, so as to increase or diminish the relative length of the two arms of the lever, and thus increase or diminish the throw of the device acted upon by the said lever. With such mechanism the adjustment can be made while maintaining one end of the lever always in contact with the cam.

The invention consists, first, in placing the fulcrum on a pivoted arm adjustable in the arc of a circle. Heretofore it has always been placed upon a slide adjustable in a right line. The pivoted arm is a simpler device, easier made, and less liable to get out of order.

The invention consists, secondly, in adjusting the pivoted arm carried by a curved rack and a pinion meshing therewith.

The invention consists, thirdly, in making the fulcrum-piece (pin, roll, or whatever device may be used) adjustable on the pivoted arm.

The invention consists, fourthly, in connecting the lever with the arm of a second lever, which latter turns on a fixed pin or stud, and supports the primary lever as well as receives motion from it, the fulcrum of the primary lever being adjustable lengthwise of the same. Heretofore a lever having a fulcrum adjustable lengthwise of the same has been pivoted to a slide to be reciprocated thereby, and a primary lever has also been pivoted to and supported by a second lever, to which it imparted motion, said second lever turning on a fixed pivot; but in this latter case the fulcrum of the primary lever was not adjustable lengthwise of the same.

The invention consists, fifthly, in the combination of the cam, the primary lever acted upon by said cam, the second lever, with which said primary lever is connected, the pivoted cam carrying the fulcrum of said primary lever, and the spring for holding the end of the primary lever or a device carried thereby against the cam.

The mechanism can be used in various machines. I have, for example, employed it to advance the vertical feeding devices of the Davis sewing-machine; but I do not intend to limit it to such use or combination.

In the Davis machine, as is well known to those familiar with sewing-machines, the needle-bar is moved forward while the needle is in the fabric, so as to feed the work. In this it is assisted by a vertical feed-bar, (called the "helper-bar,") which bears upon the fabric when the needle is down, and is advanced with the needle-bar. When the needle rises, the helper-bar is lifted also, and both are returned to their first position, leaving the fabric in the position to which it has been advanced. The needle-bar and helper-bar then descend, and are advanced, feeding the fabric another stitch. It is this advance or feed movement of the needle-bar and helper-bar which the mechanism may be used to impart.

The accompanying drawings illustrate what is considered the best mode of applying the principle of the invention.

Figure 1 is a front elevation showing the new mechanism located in the cam house or head of a Davis sewing-machine; and Fig. 2 is a vertical section in a plane at right angles to the plane of Fig. 1, showing the mode of supporting and operating the pinion for adjusting the movable fulcrum of the primary lever.

A is the cam-house; P, the shaft; B, the shaft-head or feed-cam; C, the needle-bar; Q, the pin for giving vertical reciprocation to the needle-bar; D, the vertical feed-bar or helper-bar; E, the presser-bar; F, the cloth-plate; G, the spring to assist in returning the feed and needle bars; H, the secondary lever in the form of a bell-crank; I, the fixed stud on which it turns; J, the primary lever; K′, a spring; K, the pivoted arm, carrying the fulcrum of the primary lever; L, the fulcrum-plate; 1 and 2, screws; N, the fulcrum piece or roll; O, a pinion; R, a stop-screw; S, a stop; T, the pinion-sleeve; U, the adjusting-knob; V, a nut; W, a friction-spring or conical washer, and Z an anti-friction roller.

The secondary lever or bell-crank H is secured to the inside of cam-house A by the stationary stud I. The lower arm of the secondary lever or bell-crank carries the friction-roller Z, which bears against the needle-bar C, and the stop S and screw R are used to adjust it in proper position. To the other arm of the bell-crank is secured by a rivet the primary lever J, which is free to turn on the connecting-rivet. The upper end of the primary lever J has a friction-roller, that rests against the actuating-cam B, and is maintained in contact by the flat spring K′, which is fastened to the back of the lever J, and at its free end bears against the stud I. The side of the primary lever adjacent to the fulcrum-roll N is made the part of a true circle, described from the center of the screw M, when the friction-roller in the end of feed-lever is in contact with the small part of cam B. To the bottom of the cam-house is secured by pivot-screw M the arm K, its outer edge being provided with gear-teeth, that are engaged by the pinion O. To this arm K the fulcrum-plate L is secured by the screws 1 and 2, and to the fulcrum-plate is riveted the friction-roller N, constituting the adjustable fulcrum of the primary lever J. The fulcrum-plate being provided with a hole larger than the screw 2, it can be adjusted to bring the roll N into contact with the curved side of primary lever J. The fulcrum-plate has also a projection that acts as a stop to prevent the pivoted arm K from being turned too far, so that injury would be done to the machine. The cam B is so shaped that it actuates the primary lever in the proper time as compared with the needle-bar and other parts of the machine. Of course, in applying the invention to other machines, whether for sewing or other purpose, the cam would be made of the proper shape to give the desired movement. The cam B is attached to the revolving shaft P, and the shaft revolves in the direction of the arrow. The shaft of pinion O passes through the sleeve T, fixed in a hole in the back of cam-house A, and is held in position by the sleeve T, knob U, turning with the shaft, and nut V, screwed on the end of said shaft.

To prevent the knob from turning accidentally, a thin steel concave washer, W, is placed between it and the outer end of sleeve T. When the shaft P is rotated in the direction of the arrow, the surface from 3 to 5 of the cam moves the upper end of the primary lever away from the axis of the shaft. The roll N, resting against the primary lever, operates as a fulcrum, and the lower end of said lever, attached to the bell-crank or secondary lever, is moved a distance corresponding to the position of the roll. When the fulcrum is at the lowest point, very little motion is communicated, and when shifted toward the upper end of the primary lever more movement is obtained. The primary lever and bell-crank being connected together, the bell-crank is rocked, and the roll Z imparts a corresponding lateral movement to the needle-bar and feed-bar at the same time, thus accomplishing the feed. The cam at the proper time allows the levers to return to their first position, and the needle and feed bars are returned to their first or vertical position by the spring G. The pivoted arm K and fulcrum N are adjusted by turning the knob U, whereby the pinion O is also turned, and through it the teeth at the end of the arm K and fulcrum N are adjusted.

It is apparent that the friction-roller N is always in contact with the primary lever, and that the friction-roller at the upper end of lever J is always in contact with the actuating-cam B. On this cam the points between 3 and 4 and 5 and 6 are parts of a true circle described from the center of the shaft, and the intermediate points incline to move the lever J and permit it to return in the proper time. The contact being continuous, there is no noise from the mechanism.

In the above description I have given what is considered the best mode of applying the principle of the invention, in order that those skilled in the art may be able to use the same in the most perfect form known to me; but it should be understood that, except so far as those essential matters are concerned which are herein pointed out as constituting the substance of the invention, said description is only by way of example or illustration.

The mechanism for moving the needle-bar and feed or helper bar vertically up and down has not been described, because it is or may be such as is commonly employed in the Davis sewing-machine, and because it does not in itself form a part of the invention.

Having now fully described my said invention and the manner in which the same is or may be carried into effect, what I claim is—

1. The combination, with the cam and the primary lever having one end or a device carried thereby in contact with said cam, of the fulcrum to said lever and the pivoted arm carrying the said fulcrum, the latter being adjustable lengthwise of said lever in the arc of a circle whose center is the pivot of said arm, substantially as described.

2. The combination, with the cam, the primary lever, and the fulcrum to said lever, of the pivoted arm carrying the fulcrum, and provided with gear-teeth, and the pinion meshing with said teeth for adjusting the position of said fulcrum, substantially as described.

3. The combination, with the cam, the primary lever, and the pivoted arm, of the fulcrum to said lever carried by said arm and adjustable thereon, substantially as described.

4. The combination, with the primary lever, the fulcrum adjustable lengthwise of the same, and the cam for actuating said lever, of the secondary lever turning on a fixed stud or pivot, and connected with the primary, which it supports, and from which it receives motion, substantially as described.

5. The combination of the cam, the primary lever, the fulcrum to said lever, the pivoted adjustable arm carrying said fulcrum, the secondary lever, and the spring for holding the end of the primary lever against the cam, substantially as described.

In testimony whereof I have signed this specification in presence of two subscribing witnesses.

WILLIAM S. CARLISLE.

Witnesses:
JAMES C. BURT,
E. J. PARMELEE.