No. 696,039. Patented Mar. 25, 1902.

W. GROTHE.

FEED MECHANISM FOR SEWING MACHINES.

(Application filed Feb. 1, 1901.)

(No Model.) 2 Sheets—Sheet 1.

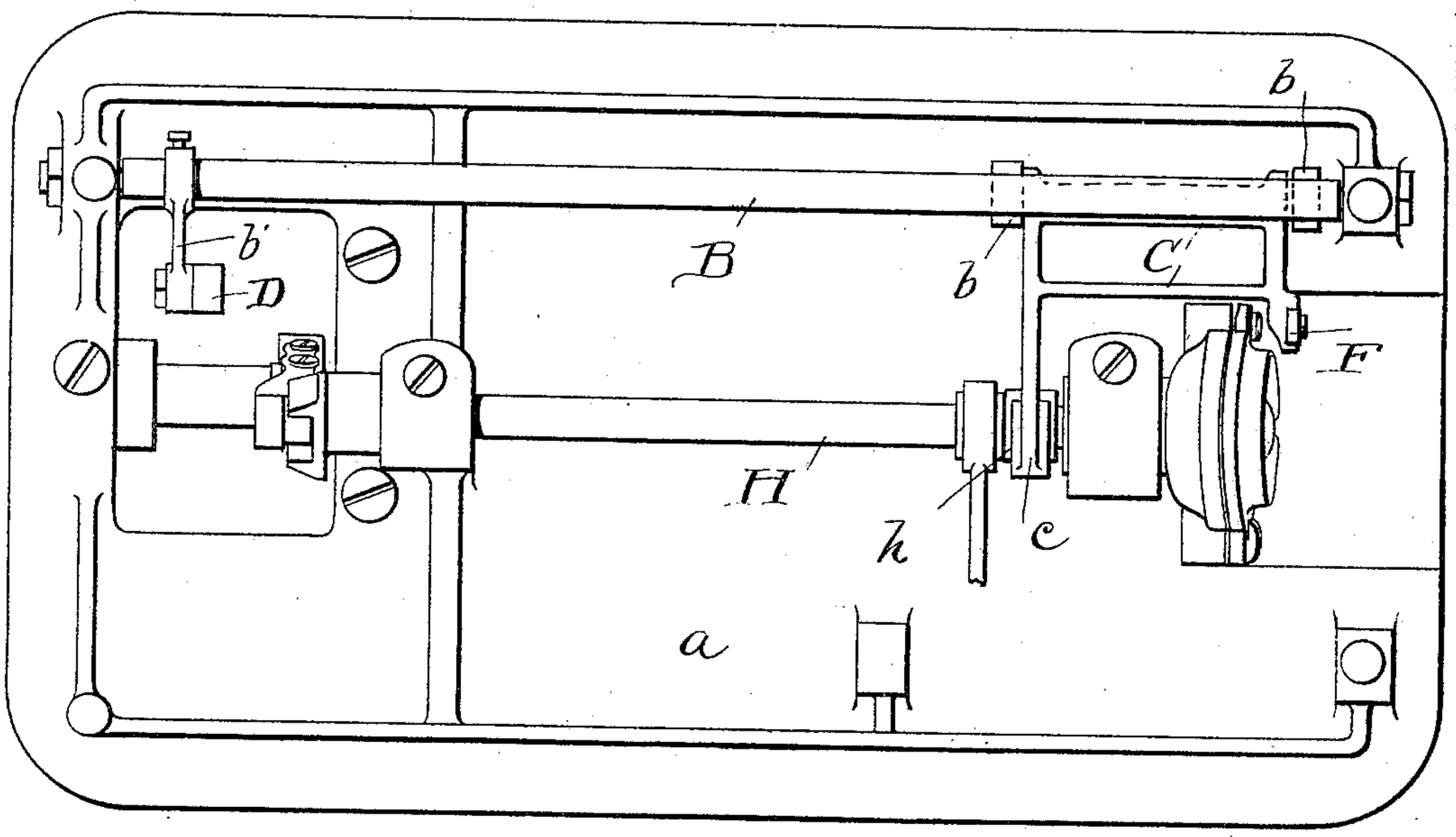

Fig. 1.

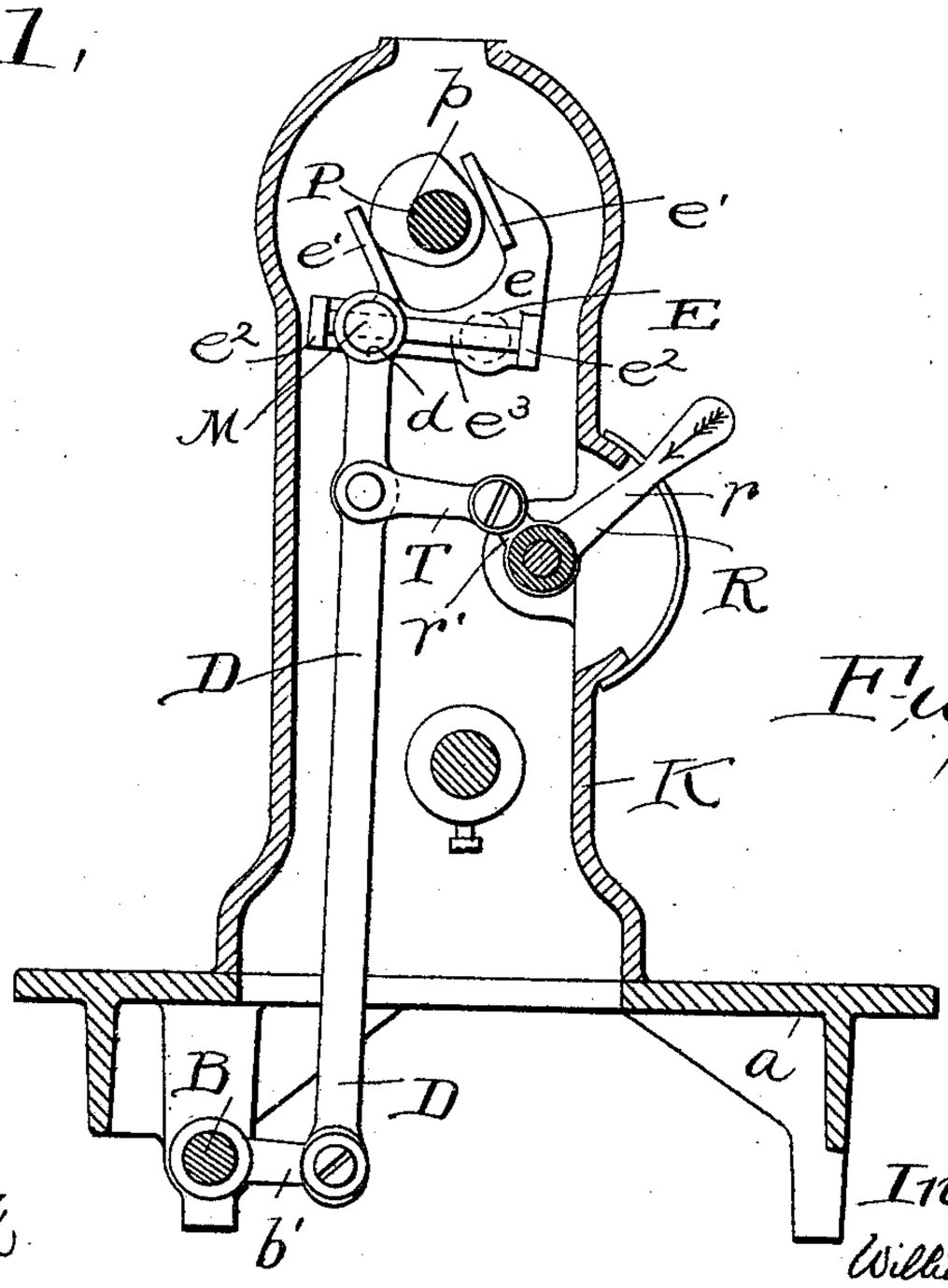

Fig. 2.

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Fig. 3.

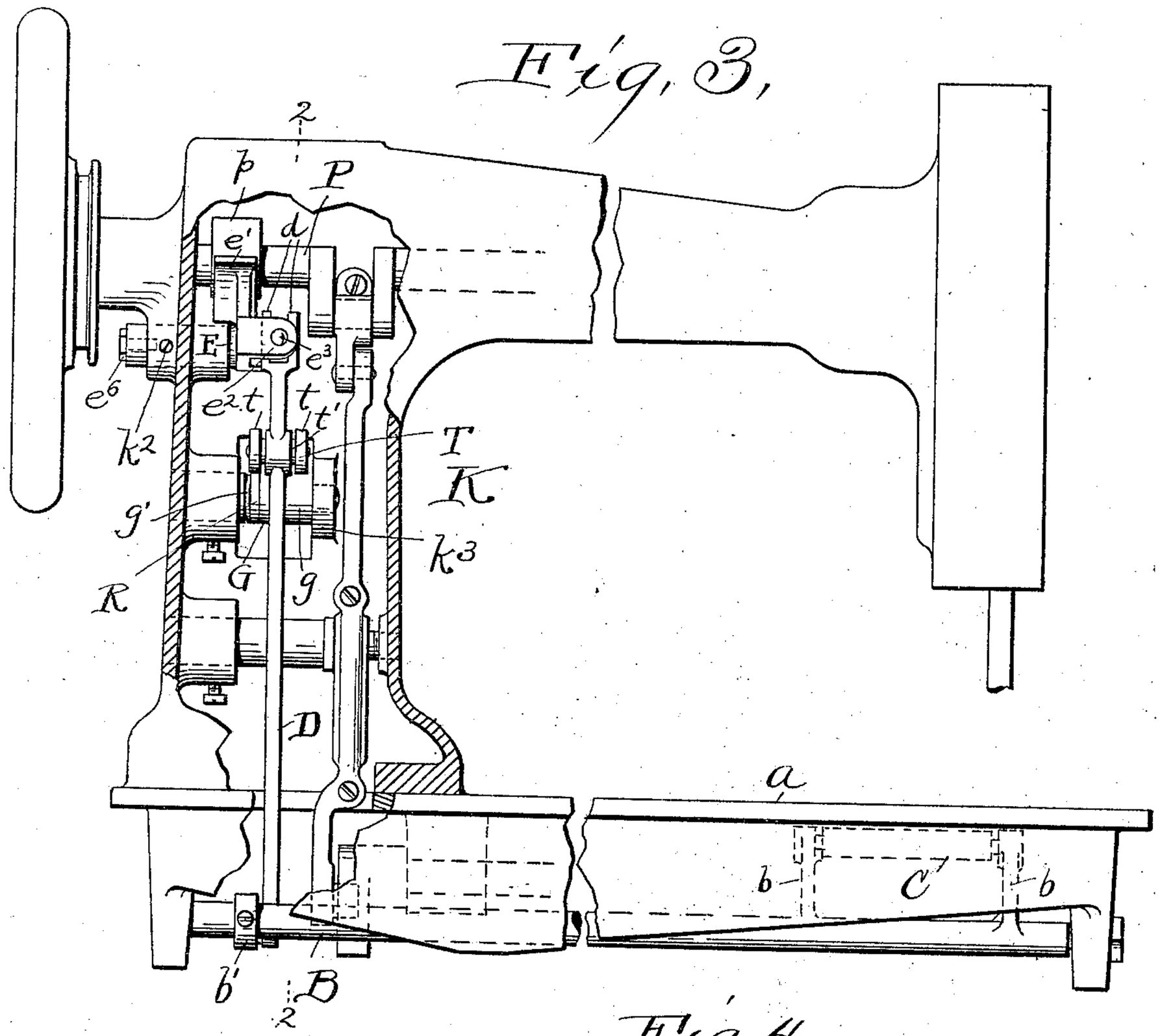


Fig. 4.

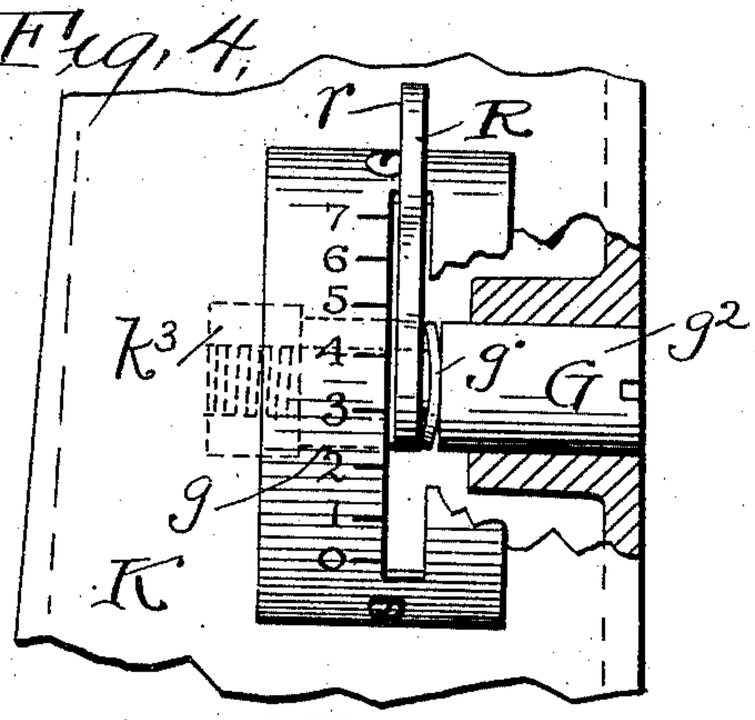


Fig. 5.

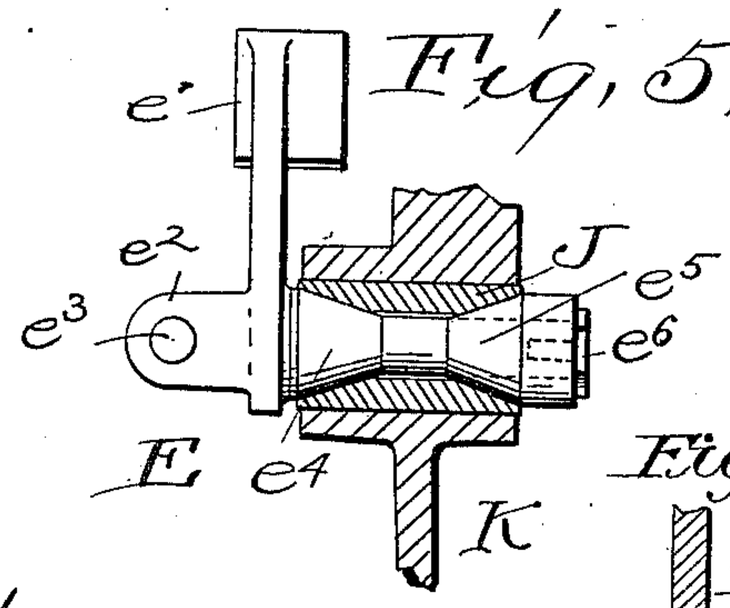
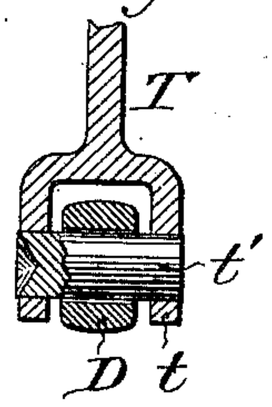


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM GROTHE, OF CLEVELAND, OHIO, ASSIGNOR TO THE WHITE SEWING MACHINE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

FEED MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 696,039, dated March 25, 1902.

Application filed February 1, 1901. Serial No. 45,536. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GROTHE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Feed Mechanism for Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to the mechanism for varying the operative movement of the feed-dog of a sewing-machine, with the result of varying the length of the stitch. The object is to provide mechanism of this character which in itself is of cheap and simple construction and which by reason of its construction may be cheaply and expeditiously secured to the head-frame of the machine in proper relationship to the parts with which it is to coöperate.

The invention consists in the construction and combination of parts hereinafter described, and pointed out definitely in the claim.

In the drawings, Figure 1 is a bottom view of a sewing-machine head equipped with my invention. Fig. 2 is a vertical sectional view on line 2 2 of Fig. 3. Fig. 3 is a front view of the head of a sewing-machine equipped with my invention, the vertical member of the arm being sectioned. Fig. 4 is a front view, partly in section, of said arm adjacent to the lever by which the stitch-controlling mechanism is moved. Fig. 5 is a longitudinal sectional view of the bearing of the rock-shaft E. Fig. 6 is a horizontal sectional view of that end of the link T which is connected with the pitman.

On the under side of the bed-plate *a* of the sewing-machine head the rock-shaft B is mounted. It has two substantially vertical arms *b b*, to the upper ends of which a frame C is pivotally connected. This frame carries the feed-dog F and has a forked arm *c*, which embraces a cam *h* on the rotatable shaft H. The rocking of the rock-shaft B and the rotation of the said cam impart to the frame and the feed-dog F (which is rigidly fastened to it) the four-way movement it must have, it being clear that the movement which feeds the cloth, and consequently regulates the length of the stitch, is due to the rocking of the rock-shaft B. This rock-shaft B has a substantially horizontal crank-arm *b'*, which is pivotally connected to the lower end of a pitman D, the upper end of which is pivotally connected with a crank-arm *e*, fast to a rock-shaft E. This rock-shaft E has a forked arm *e'*, which embraces a cam *p* on the rotating shaft P, the rotation of which causes, through the described mechanism, the rocking of the rock-shaft B. So much of the mechanism as is above described is of familiar form and not of my invention, and I do not intend that the claim herein shall be limited to the specific mechanism described further than is expressly stated herein.

The connection of the pitman D with the crank-arm *e* is a sliding connection, through which the operative length of the crank-arm *e* is varied. The specific sliding connection shown is not of my invention, but is shown and described because it is the best sliding construction now known to me and because in certain respects parts of the mechanism shown which are of my invention are expressly adapted to coöperate with it. The crank-arm *e*, as shown, has at its ends two ears e^2 e^2, in which a cylindrical rod e^3, passing between them, is secured. A cylindrical block M is slidably mounted on this rod, which passes through a diametric hole in the block. The pitman D has two ears *d d*, which embrace the cylindrical ends of said block M and are thereby pivotally connected with it.

These ears lie close to the rod e^3, whereby the described connection between the pitman ends and said block is maintained. The described construction between the pitman and the crank-arm *e* is therefore a sliding connection, but is also such a connection that the pitman may swing in two directions—namely, about the axis of the rod e^3 and also about the intersecting axis of the block M.

Heretofore the rock-shaft corresponding with the rock-shaft E has been mounted directly in a bearing bored in the arm K of the head-frame. This is objectionable in that the inside face of this bearing must be smoothed off, and this face must occupy a certain defi-

nite relationship to other mechanism, notably the mechanism for sliding the connection between the pitman and the crank-arm *e*. Moreover, if it is desired to mount the rock-shaft E in adjustable bearings the mounting of these bearings in the arm K is a delicate and comparatively expensive operation. To avoid all of these objectionable characteristics, the rock-shaft E is mounted in an independent sleeve J, which may be inserted and adjusted in a hole in the arm K and then made fast by a set-screw. In the construction shown the rock-shaft has a cone e^4 formed upon it and a cone e^5 adjustably secured to it, and these cones fit the hole in such sleeve J. The adjustable cone is slidably mounted on the shaft E and may be adjusted toward the fixed cone by a screw e^6, which screws into the end of said shaft. When the cone is properly adjusted, it is fixed in position by a set-screw e^6. To make this adjustment, therefore, it is only necessary to handle the sleeve and the parts supported by it, and when the adjustment is completed the sleeve may then be inserted in the hole in the arm K and moved to occupy the proper position therein and then made fast by a set-screw k^2.

The mechanism for sliding the connection between the pitman D and arm *e* is as follows: A bell-crank lever R is mounted on a stud G, which is screwed into an ear k^3 on the arm K. One arm *r* of this lever serves as an operating-handle. The other arm *r'* is connected by a link T with the pitman D. The end of said link has two parallel ears *t t*, between which the pitman lies and to which it is connected by a pivot-pin *t'*, on which said pitman is loosely mounted. The distance between the ears *t t* is greater than the width of the pitman, and consequently the pitman will adjust itself by lateral movement on said pivot-pin, so that it will occupy the operative position relative to the crank-arm *e*. The stud G passes through the outer wall of the arm K and screws into an ear k^3 on said arm. A loose sleeve *g* on the stud lies just inside this ear. The lever R embraces the stud between said sleeve and the head of said stud, and a bent spring-washer *g'* lies between said lever and the head g^2 of the stud. When the stud is screwed into the ear k^3, this washer *g'* is clamped more or less tightly between the sleeve *g* and lever and acts as a friction-brake to hold the lever in any position to which it may be moved for the purpose of adjusting the length of the stitch. By moving the handle *r* of the lever downward the pitman is moved so as to shorten the operative length of the crank-arm *e*, and consequently to shorten the stitch.

I claim—

In a sewing-machine, a feed-dog, mechanism, including a rock-shaft B, for actuating it, and a crank-arm *b'* secured to said rock-shaft, combined with a sleeve, a rock-shaft E mounted in the sleeve, the elongated hollow projection of the machine-head in which said sleeve is adjustably fixed, a crank-arm *e* secured to said rock-shaft, a pitman pivotally connected to the two crank-arms, and means for sliding the connection between the upper end of the pitman and the crank-arm *e* with which it is connected toward and from the axis of the shaft, substantially as and for the purpose specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

WILLIAM GROTHE.

Witnesses:
E. B. GILCHRIST,
E. L. THURSTON.