

(No Model.)

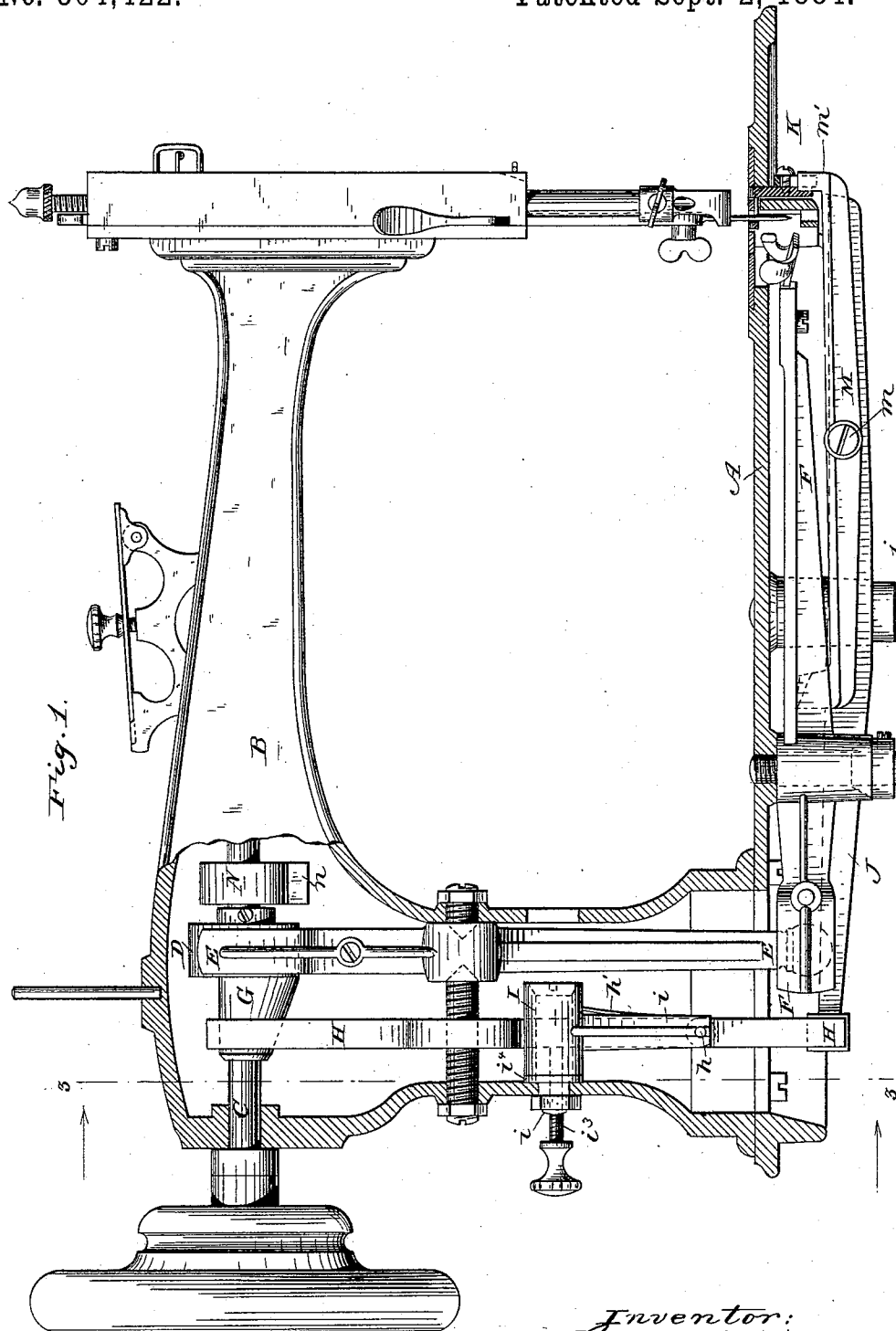
3 Sheets—Sheet 1.

L. K. FULLER.

FEED OPERATING MECHANISM FOR SEWING MACHINES.

No. 304,422.

Patented Sept. 2, 1884.



Witnesses:  
H. A. Low  
E. D. Smith

Inventor:  
Levi N. Fuller  
by Henry C. Fuller

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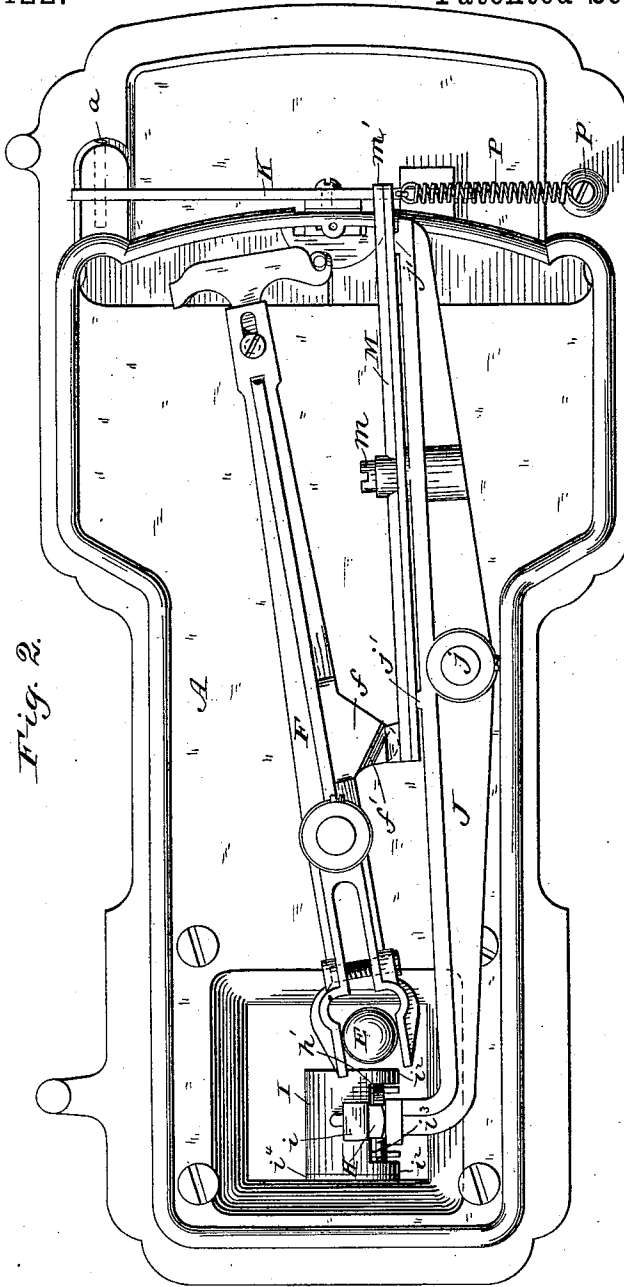


Fig. 2.

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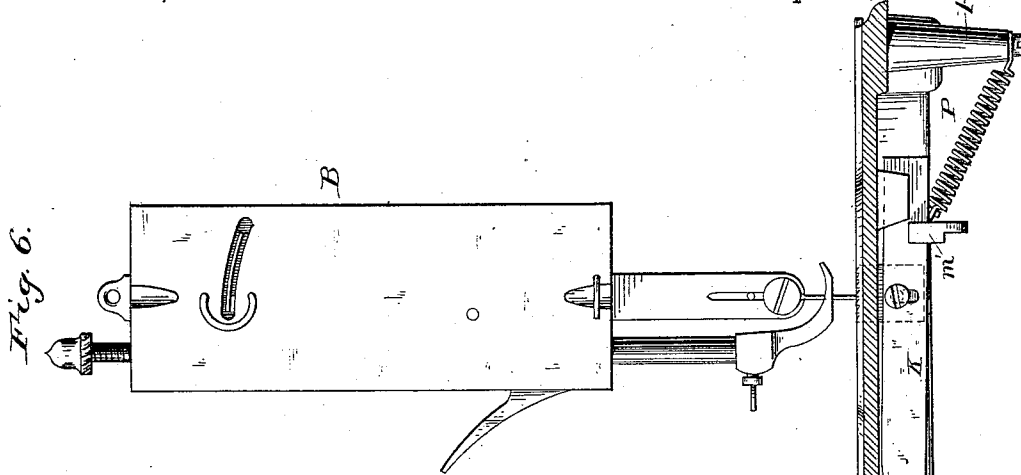


Fig. 6.

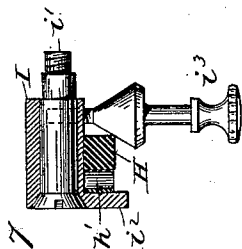


Fig. 7.

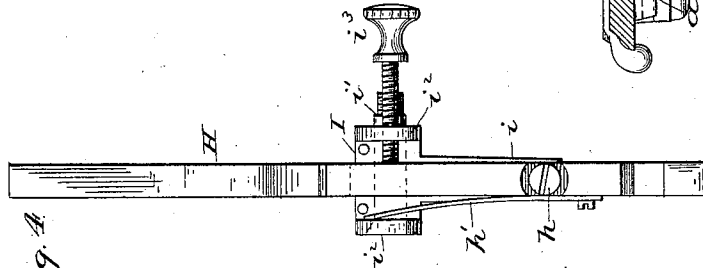


Fig. 8.

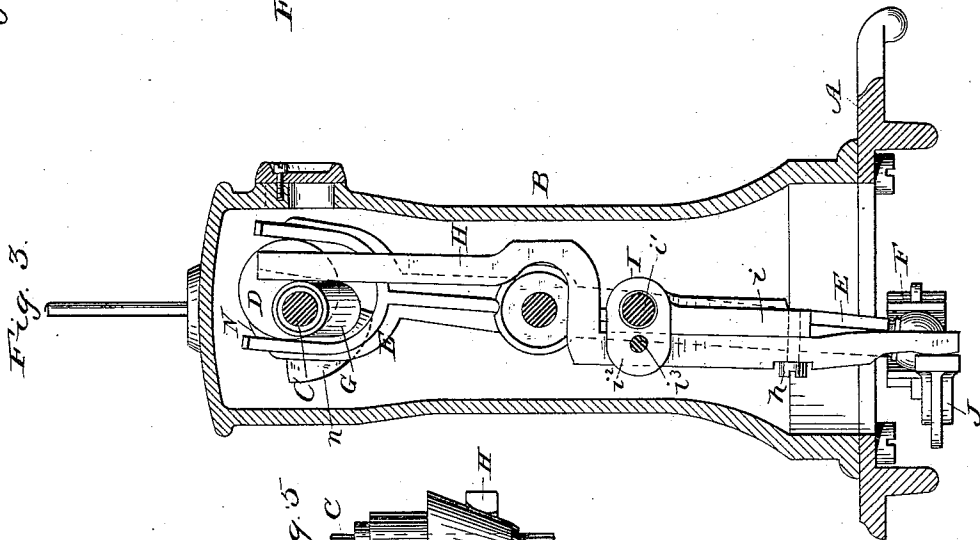


Fig. 9.

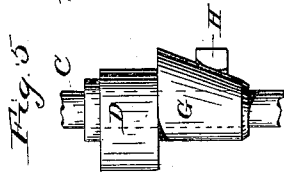


Fig. 10.

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# UNITED STATES PATENT OFFICE.

LEVI K. FULLER, OF BRATTLEBOROUGH, VERMONT.

## FEED-OPERATING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 304,422, dated September 2, 1884.

Application filed May 6, 1884. (No model.)

To all whom it may concern:

Be it known that I, LEVI K. FULLER, a citizen of the United States, residing at Brattleborough, in the county of Windham and State of Vermont, have invented certain new and useful Improvements in Feed-Operating Mechanism for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is the production of accurately-balanced feeding and shuttle-operating mechanisms which are simple in construction and effective in operation.

In the drawings, Figure 1 is a sectional side elevation of a sewing-machine embodying my improvements. Fig. 2 is a bottom plan view of the same. Fig. 3 is a vertical section on the line 3 3, Fig. 1, looking in the direction of the arrows near said line. Figs. 4 and 5 are detail views of portions of the feeding mechanism. Fig. 6 is a front end elevation of my machine with the bed-plate in section, and Fig. 7 a detail of a modification of the feed-regulating device.

A indicates the bed-plate, and B the bracket-arm secured thereto in any suitable manner.

C is the driving-shaft, journaled in the upper portion of the bracket-arm and carrying at its forward end the usual appliances for operating the needle-bar.

D is an eccentric secured to the driving-shaft and embraced by the upper forked end of the vertical shuttle-operating lever E, the latter being loosely connected at its lower end to the rear end of the horizontal shuttle-lever F in a well-known manner.

G is the feed-cam, secured to the driving-shaft adjacent to the shuttle-operating eccentric, the working-face of said feed-cam being of a conical form, as clearly shown.

H is a vertical feed-operating lever, which is pivoted by a screw, *h*, to the downwardly-projecting arm *i* of a saddle or yoke, I, loosely supported on a bolt or pivot-stud, *i'*, sustained by the bracket-arm. This pivoted yoke I is provided with ears *i''* on opposite sides of the lever H. A spring, *h'*, (shown in the present instance as a plate-spring,) is interposed between the lever H and one of the said ears, thus serving to hold the said lever in contact

with an adjusting-screw, *i''*, passing loosely through a hole in the bracket-arm and tapped in the opposite ear.

It will be obvious that by turning the screw *i''* in one direction or the other the lever H will be adjusted on its pivot *h*, thus moving its upper end, which is in contact with the feed-cam G, longitudinally of said cam, for the purpose of bringing said lever in contact with the part of said cam having the requisite throw to produce the length of feed desired. A washer, *i''*, (see Fig. 1,) is preferably interposed between the pivoted yoke I and the inside of the bracket-arm to lessen friction.

Instead of arranging the adjusting-screw *i''* as above described, said screw might be provided with a conical portion adapted to engage the lever H to adjust it against the spring *h'*, (see Fig. 7,) said screw in such case being passed through the front side of the bracket-arm at a right angle to the position occupied by the screw shown in Figs. 1, 3, and 4.

As it is desirable to pivot the vertical feed and shuttle levers centrally of the bracket-arm in a horizontal direction, and as the pivotal point of the shuttle-lever is above that of the feed-lever, the latter lever, to avoid contact with the longer pivot-screw of the shuttle-lever, is formed with a bent portion partially surrounding said pivot-screw and offsetting the lower portion of said feed-lever from its upper portion, as seen in Fig. 3.

To bring the upper end of the feed-lever smoothly in contact with the conical working-face of the feed-cam, said upper end is preferably beveled or chamfered off, as shown in the detail view, Fig. 5, to correspond approximately with the said working-face. The pivotal connection of the lever H with the arm *i* of the yoke I at some distance from the pivotal point of the latter admits of a very considerable adjustment of the upper end of said lever without moving its lower end, which is in contact with the horizontal feed-lever, to much extent.

J is the main horizontal feed-lever, pivoted on a stud, *j*, secured to the bed-plate A, and having its rear end in contact with the lower end of the lever H. To said main feed-lever is pivoted, at *m*, the auxiliary or lifting feed-

lever M, the latter being preferably provided at its forward end with a projection, *m'*, fitting a recess in the feed-bar K. (See Figs. 1, 2, and 6.) The feed-bar is thus supported at one end  
 5 slotted to embrace a pin, *a*, passing through one of the guides for the feed-bar in a well-known manner. As the lever M is pivoted to and carried by the lever J, the horizontal movements of the latter will be communicated to the  
 10 former, which thus serves, by means of its connection with the feed-bar, to transmit the horizontal movements of the lever J to said bar.

To move the lever M vertically, for the purpose of lifting the feed-bar, the shuttle-lever F is provided with a wing or projection, *f*, (see Fig. 2,) having a cam or incline, *f'*, between two horizontal surfaces. The projection *f* engages with the rear end of the lifting-lever M, and as the shuttle-lever vibrates, the said lifting-lever will be moved at the proper moment to raise the feed-bar. A spring, P, (see Figs. 2 and 6,) secured to the feed-bar K and to a post, *p*, on the bottom of the bed-plate  
 20 A, serves to move the feed-bar downward and backward, and also to hold the rear end of the lever M in contact with the wing *f* on the shuttle-lever F. The force of said spring, communicated through the lever M to the lever J,  
 30 keeps the rear end of the latter lever in constant contact with the lower end of the vertical feed-lever H, thus forcing the upper end of said vertical lever against the feed-cam G. The main feed-lever J is preferably provided with ribs or bearings *j'* for the lever M to  
 35 work against, thereby lessening the frictional contact of the latter lever with the former. (See Fig. 2.)

On the driving-shaft C is mounted a collar, N, having a radially-projecting portion, *n*, forming a counter-balance for the shuttle-operating eccentric and the feed-cam, said projecting  
 40 portion being so arranged relatively to said eccentric and cam as to counterbalance their projecting portions on the driving-shaft, and thus contribute to a smooth and even movement of the latter.

The operation of my mechanism is as follows: As the driving-shaft is rotated, the eccentric thereon will impart the usual vibratory motion to the shuttle-levers, while the feed-levers H and J will be vibrated intermittingly by the feed-cam and the co-operating spring, thus giving the requisite intermittent forward and backward movements to the  
 55 feed-bar, the latter being raised and lowered at proper intervals by the auxiliary lever M and the spring, thereby producing the well-known "four-motion" feed.

Instead of operating the main horizontal feed-lever by the mechanism shown, said feed-lever may be so connected with the feed-cam as to receive positive movements in both directions, as by a vertical lever, with an adjustable fulcrum, and having a yoke at its  
 65

upper end, embracing a feed-cam, and a forked connection at its lower end with the horizontal lever.

I claim as my invention—

1. In a sewing-machine, the combination, with a feed-bar, of a main feed-lever, an auxiliary feed-lever pivoted to said main feed-lever, and means for intermittingly vibrating said levers in planes at right angles to each other, substantially as described. 75

2. In a sewing-machine, the combination, with a feed-bar, of a main feed-lever pivoted beneath the bed-plate, an auxiliary feed-lever pivoted to said main feed-lever, means for vibrating said main feed-lever horizontally, and means for vibrating said auxiliary feed-lever vertically, substantially as set forth. 80

3. In a sewing-machine, the combination, with a feed-bar, of main and auxiliary feed levers, the latter pivoted to the former, and both arranged beneath the bed-plate, mechanism for vibrating said main feed-lever horizontally, and a shuttle-lever having a device for moving said auxiliary feed-lever vertically, substantially as described. 85 90

4. In a sewing-machine, the combination, with a feed-bar, of a main horizontal feed-lever, an auxiliary feed-lever pivoted to said main feed-lever, means for vibrating said auxiliary lever vertically, a vertical feed-lever engaging said main horizontal feed-lever, and means for vibrating said vertical lever, substantially as described. 95

5. In a sewing-machine, the combination, with a feed-bar, of a main horizontal feed-lever, an auxiliary feed-lever pivoted to said main feed-lever, means for vibrating said auxiliary lever vertically, a vertical feed-lever engaging said main feed-lever, means for vibrating said vertical lever, and means for varying the vibrations thereof, substantially as set forth. 100 105

6. The combination, with the bracket-arm of a sewing-machine, of a driving-shaft, a conical feed-cam thereon, a saddle or yoke pivoted to the vertical portion of said bracket-arm, a vertical feed-lever pivoted to said yoke, an adjusting-screw for varying the position of said lever relative to said cam, and a spring to hold said lever against said screw, substantially as set forth. 110 115

7. The combination, with the bracket-arm of a sewing-machine, of a driving-shaft, a conical feed-cam thereon, a saddle or yoke pivoted to the vertical portion of said bracket-arm, and provided with a downwardly-projecting arm, a feed-lever pivoted to the said arm of said yoke, an adjusting-screw for varying the position of said lever relative to said cam, and a spring serving to hold said lever against said screw, substantially as set forth. 120 125

8. In a sewing-machine, the combination, with a feed-bar, of main and auxiliary feed-levers, the latter pivoted to the former, lugs on one of said levers for lessening their fric- 130

tional contact, and means for intermittingly vibrating said levers in planes at right angles to each other, substantially as set forth.

9. The combination of the driving-shaft C, eccentric D, shuttle-levers E and F, the latter having a wing or projection, *f*, formed with an incline, *f'*, the feed-cam G, feed-levers H, J, and M, yoke I, feed-bar K, and spring P, substantially as set forth.

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

LEVI K. FULLER.

Witnesses:

W. H. CHILDS,  
J. E. HALL.