

(No Model.)

W. S. BROWN.
FEEDING MECHANISM FOR SEWING MACHINES.

No. 469,199.

Patented Feb. 16, 1892.

Fig. 1.

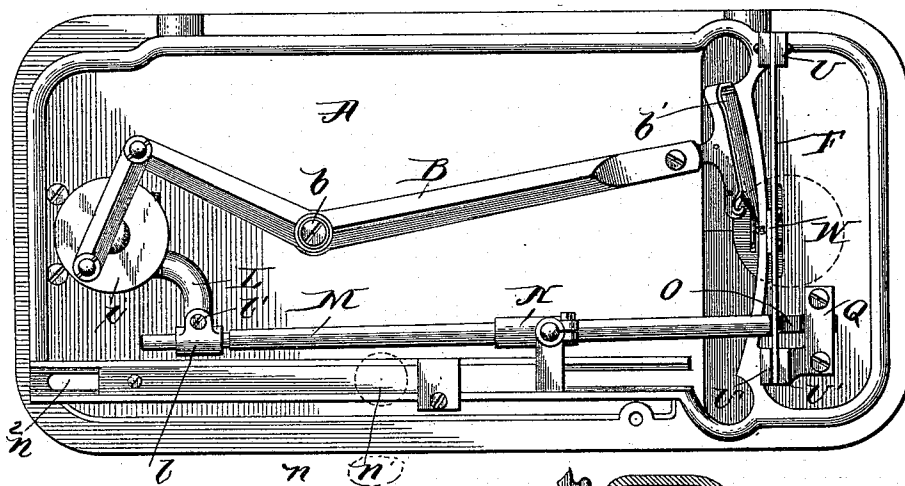


Fig. 2.

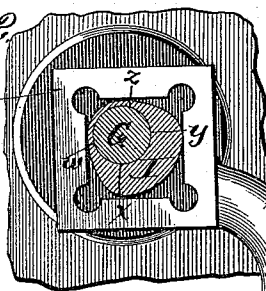


Fig. 3.

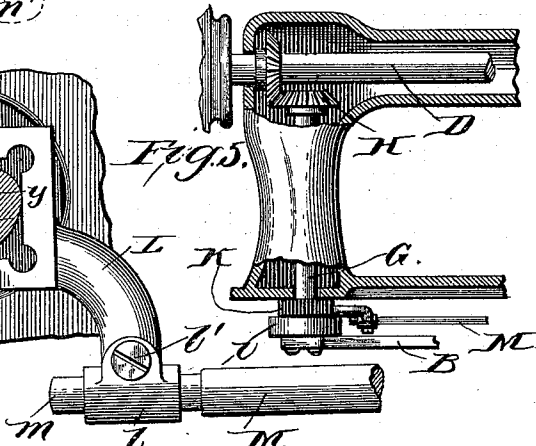
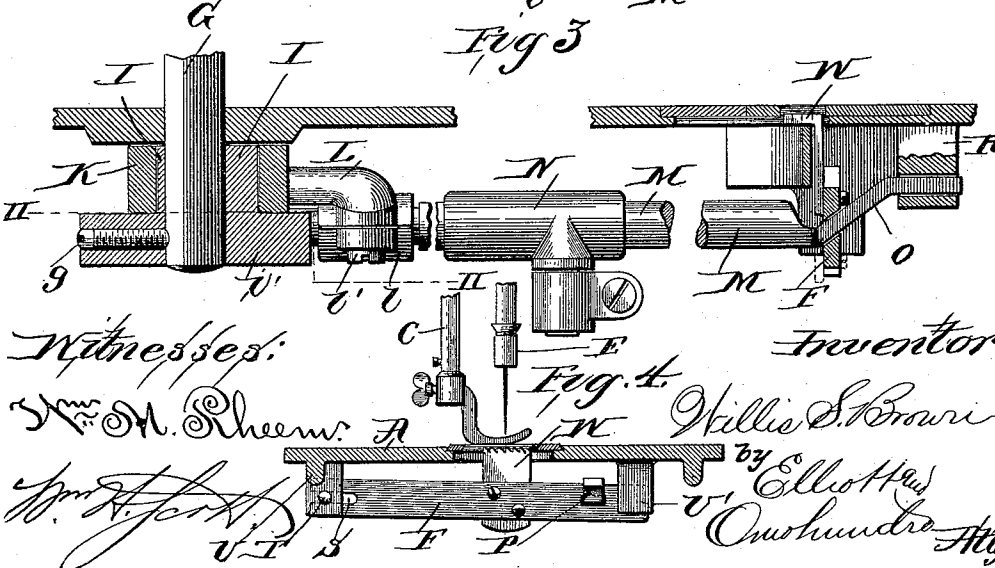


Fig. 4.



Witnesses:

Wm. M. Rhem.

[Signature]

Inventor:

Willis S. Brown

[Signature]
by *[Signature]*
One hundred

UNITED STATES PATENT OFFICE.

WILLIS S. BROWN, OF BELVIDERE, ILLINOIS.

FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 469,199, dated February 16, 1892.

Application filed October 20, 1891. Serial No. 409,267. (No model.)

To all whom it may concern:

Be it known that I, WILLIS S. BROWN, a citizen of the United States, residing at Belvidere, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to that class of sewing-machines designed to impart to the feed the reciprocating movement commonly known to the sewing-machine fraternity as the "four-way" reciprocation. In prior attempts to properly produce this motion it has been common to employ a feed-bar capable of vertical oscillation and longitudinal reciprocation, which derives its motion from an ordinary eccentric through the medium of an oscillatory longitudinally-reciprocating cam bar or lever whose cam end reciprocates back and forth through an opening in the feed-bar, and thus produces the rising and falling motion to the feed, while the oscillation of the cam bar or lever gives the feed its forward and backward strokes, the eccentric being rotated by a vertical shaft usually miter-gearred to the needle-bar shaft, upon which the upper pulley or belt wheel is secured. Such a construction it has been found is defective, in that the feed, instead of being given the four positive and distinct rectilinear reciprocations essential in a perfect feed, is carried in a continuous curvilinear orbit, owing to the unceasing action of the ordinary eccentric, and, as will be understood, the result of this is that the goods, instead of being positively impinged by the feed before the latter begins its rearward or feeding stroke, are not fully impinged until the feeding stroke is about half completed, and scarcely does it fully impinge the goods before it begins to relax its grip upon them, and its frictional contact therewith continues to grow less throughout the balance of the feeding stroke. Thus, approximately speaking, the first half of the feeding stroke is consumed in bringing the feed into contact with the goods and the latter half in withdrawing it therefrom. This is a fault which is generally conceded and many attempts to avoid it without the employment of intricate mechanism have been made. Notably among these, and the one which heretofore was probably considered the nearest approach to per-

fection, employs on the needle-bar shaft an irregular eccentric or cam which works in a square strap or yoke having connection through the intermediary of a vertical lever with a horizontal lever, to which the shuttle-bar is attached by means of a ball or universal joint, the two levers being connected together by means of a universal joint also. This construction, however, beyond being too costly and complicated, is otherwise objectionable, in that it is necessary to employ a train of numerous joints and connections to transmit the motion of the eccentric to the feed-bar, which joints are apt to slip or become deranged, and they require great care and precision for their proper adjustment. A further objection to the general arrangement of such a construction is that it is not a "gear-machine"—that is, a machine in which the needle-bar shaft transmits its motion to the feed and shuttle through the medium of a vertical rotary shaft, as in the plain eccentric machines—which gear connection is generally considered the best mode of supplying motion to the shuttle and feed-actuating mechanisms, as it is most rigid and direct in its action and without intricate joints to work loose and wear out and enables the placement of all parts requiring adjustment under the cloth-plate, where convenient access to them may be had.

The prime object of my invention, therefore, is to overcome these defects and to produce the desired four-way rectilinear motion in a gear-machine by mechanism which shall be much simpler and more effective in the performance of its functions than any heretofore employed for the attainment of such motion and one which shall be equally as simple in construction as even the ineffectual plain eccentric constructions heretofore referred to.

A further important object of my invention is to provide the machine with means whereby the maximum altitude of the feed may be varied—that is, the feed adjusted vertically by the simple adjustment of a single connection.

With these ends in view my invention consists in certain features of novelty by which the objects specified are attained, and also in other features for the accomplishment of

certain other objects of minor importance, all of which will be more fully described hereinafter in connection with the accompanying drawings, and particularly pointed out in the 5 claims.

In the said drawings, Figure 1 is a bottom plan of the bed of the sewing-machine, showing my improvements applied thereto. Fig. 2 is an enlarged detail, partly in section, of 10 the peculiar form of cam or eccentric employed, showing its yoke connected to the end of the feed-actuating lever, more fully described hereinafter, the section being taken on the line II II, Fig. 3. Fig. 3 is a fragmentary view on the same scale as Fig. 2, 15 partly in section. Fig. 4 is a side elevation of the feed-bar on a smaller scale, certain parts being omitted for the sake of clearness, and the cloth-plate being shown in section; 20 and Fig. 5 is a side elevation, partly in section, showing the miter-gear connection between the needle-bar shaft and the upright or vertical driving-shaft upon which the eccentric is secured.

In the drawings, wherein like signs of reference refer to like parts throughout the several views, A indicates the cloth-plate; B, the shuttle-lever pivoted thereto; C, the 30 presser-foot; D, the needle-bar shaft; E, the needle-bar actuated thereby, and F the feed-bar, all of the usual and well-known constructions.

As in the ordinary gear-machine, the vertical driving-shaft G is provided with suitable journal-bearings (not shown) in the upright arm of the machine-frame and derives its motion from the needle-bar shaft E through the medium of miter-gears H or other similar and suitable connections. On the lower end 40 of the shaft G, just beneath the cloth-plate A, is keyed or otherwise secured a cam or irregular eccentric I, which works in and is embraced by a square or rectangular yoke or strap K, having an outwardly-bent arm L, 45 which is secured to the end of the feed-actuating lever M. This lever M is mounted in an adjustable or shifting fulcrum N in the usual manner, so as to be capable of longitudinal reciprocation, as well as oscillation, 50 upon its fulcrum, and it is provided at one end with an inclined portion or cam O, which works back and forth through a complementary slot P near the end of the feed-bar F, and its extreme end is straightened and supported by a guide-plate Q, suitably secured 55 to a hanger R, depending from the under side of the cloth-plate, the other end of the feed-bar being provided with a longitudinal slot S, through which passes a fixed pin T, secured 60 in two guide-lugs U, also depending from the cloth-plate in the usual manner. Thus it will be seen that the oscillations of the reciprocating cam-lever M will cause the feed-bar F to slide back and forth in a longitudinal 65 direction on the pin T, while the reciprocating movement of such lever will cause the feed-bar to rise and fall in the act of engag-

ing and releasing the fabric being sewed, the forward end of the feed-bar being restricted to a vertical movement by means of two de- 70 pending guides U.

Assuming that the feed W is in its forward position in Fig. 4 ready to rise into engagement with the goods, it is very evident that its upward motion should be strictly vertical 75 until it comes in actual contact with the goods and that its next movement should be strictly horizontal, so as to advance the goods under the presser-foot with a positive feed and uniform pressure, and finally release its 80 hold on the goods not until the feeding or horizontal stroke is fully completed, and that it should release the goods suddenly or descend in strictly a vertical direction. In order 85 to produce this positive feed or four-way motion, I employ the peculiarly-formed eccentric shown in Fig. 2, whose periphery at two points is concentric with the driving-shaft G. The first of these concentric por- 90 tions extends from the point *x* to the right as far as the point *y*, and the other from the point *w* to the right as far as the point *z*, the result of which arrangement is that the cam or eccentric slides a short distance on each 95 face of the strap or yoke without imparting motion to the latter, and hence the yoke or strap is moved in a strictly straight line at every quarter-revolution of the eccentric, and is thus caused to travel in a strictly square or rectilinear path, which rectilinear motion 100 is of course imparted through the medium of the lever M and its cam end O and the feed-bar F to the feed W itself.

In order that the maximum altitude of the feed may be varied, I have provided the outer 105 end of the arm L with a split sleeve or collar *l*, which receives the reduced end *m* of the lever M, and is securely clamped thereto by means of a set-screw *l'*, so that the initial position of the cam O in the slot P in the feed- 110 bar may be changed at will and thus cause the serrated face of the feed W to grip the goods with more or less friction, it being of course understood that any increase or decrease in the leverage thus caused may be 115 compensated for by the adjustment of the fulcrum-slide *n*, which is secured in place by means of a set-screw *n'*, working through a slot *n*² in the cloth-plate in the usual and well-known manner, and also serves as means 120 for varying the length of the feeding stroke by changing its position on the lever M.

I prefer to form the arm L in the same plane with the strap or yoke K, as shown in the drawings, and curve or bend its end outward 125 transversely of the cloth-plate and arrange the sleeve L transversely of such arm, so as to bring the latter in alignment with the lever M in a convenient position for connection therewith and out of the way of the shuttle- 130 lever B and its pivot or fulcrum *b*, though I do not wish to confine myself to this particular construction.

The eccentric I is preferably formed inte-

grally with the crank disk or wheel *i*, which latter is secured to the shaft G by a key or set-screw *g* and supports the yoke or strap K upon its upper side; but if found desirable the crank-disk and eccentric may be formed separately and secured to the shaft G by independent connections.

The shuttle-lever B is connected to the wrist-pin of the disk *i* by a link, as shown, and at the long end of such lever is supported the shuttle *b*, which is carried by said lever in a curved course or race, as usual.

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

1. In a sewing-machine, the combination, with the needle-bar shaft and the upright driving-shaft geared thereto, of an irregular eccentric on said upright shaft, a rectangular yoke embracing said eccentric and having the outwardly-bent arm L, the feed-bar, and a cam-lever for actuating said feed-bar adjustably connected to said arm, substantially as set forth.

2. In a sewing-machine, the combination, with the upright driving-shaft, of an irregular eccentric secured on said shaft below the

cloth-plate, a square yoke or strap embracing said eccentric, the feed-bar, a cam-lever for actuating said bar, and an adjustable connection between said strap and lever, substantially as set forth.

3. In a sewing-machine, the combination, with the needle-bar shaft and the upright driving-shaft geared thereto, of an irregular eccentric secured to said upright shaft, a square yoke or strap embracing said eccentric and having the arm L, a split sleeve formed on said arm transversely thereof, the feed-bar, and a cam-lever for actuating said feed-bar having a reduced end clamped in said split sleeve, substantially as set forth.

4. In a sewing-machine, the combination, with the upright driving-shaft, of an irregular eccentric secured to said shaft below the cloth-plate, the feed-bar having a slot therein, a reciprocating cam-lever having the cam O situated in said slot, and an adjustable connection between said eccentric and the said lever, substantially as set forth.

WILLIS S. BROWN.

Witnesses:

DAVID PATTON,
B. ELDRIDGE.