

J. R. MOFFATT.

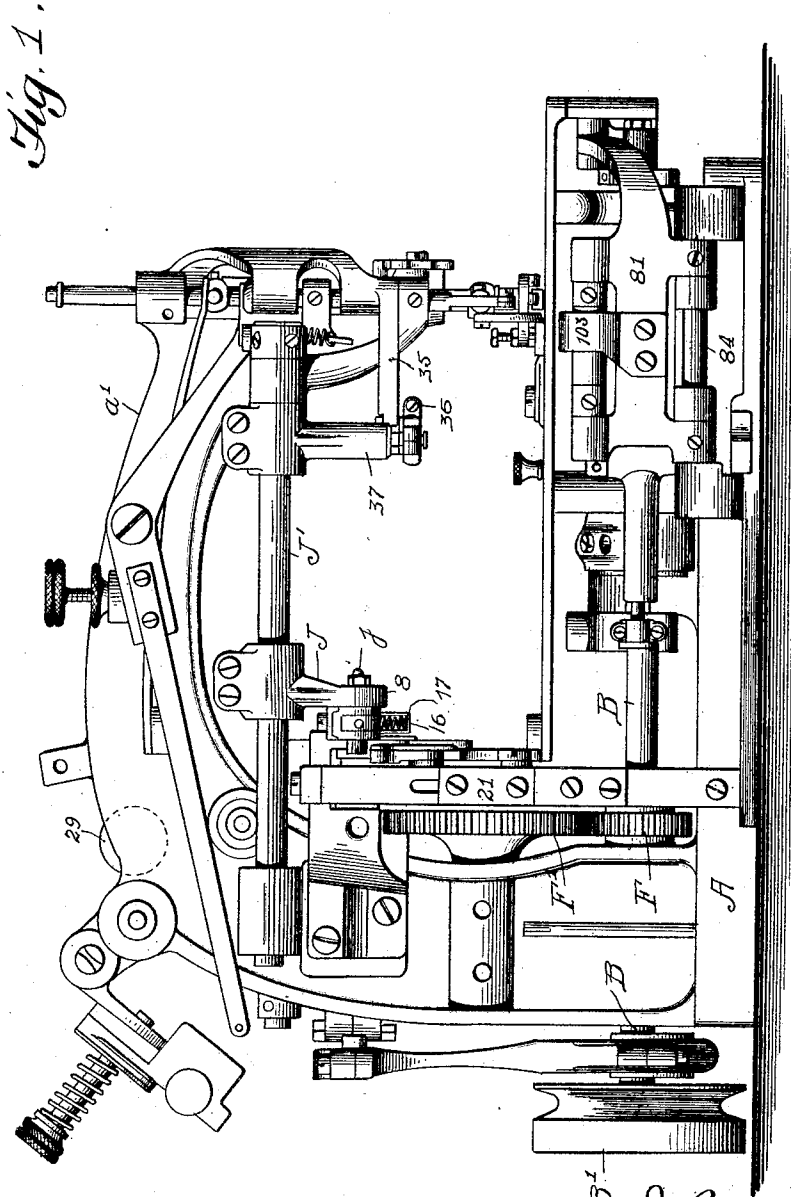
ZIGZAG, STRAIGHT AWAY, STITCH SEWING MACHINE WITH TOP FEED.

APPLICATION FILED NOV. 28, 1905.

1,109,635.

Patented Sept. 1, 1914.

7 SHEETS-SHEET 1.



Witnesses
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Albert Hopkins

J. R. Moffatt Inventor
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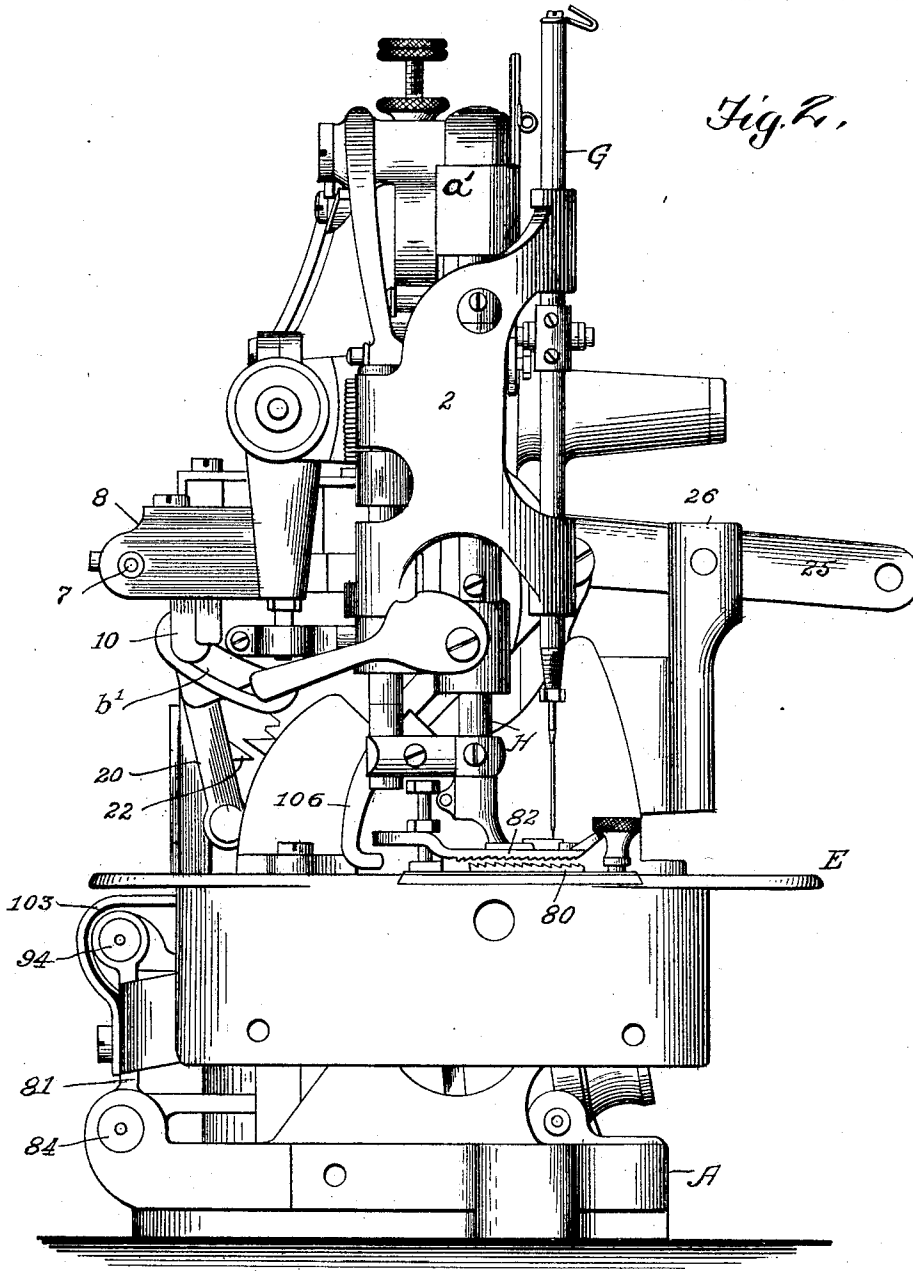


Fig. 2.

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Witnesses

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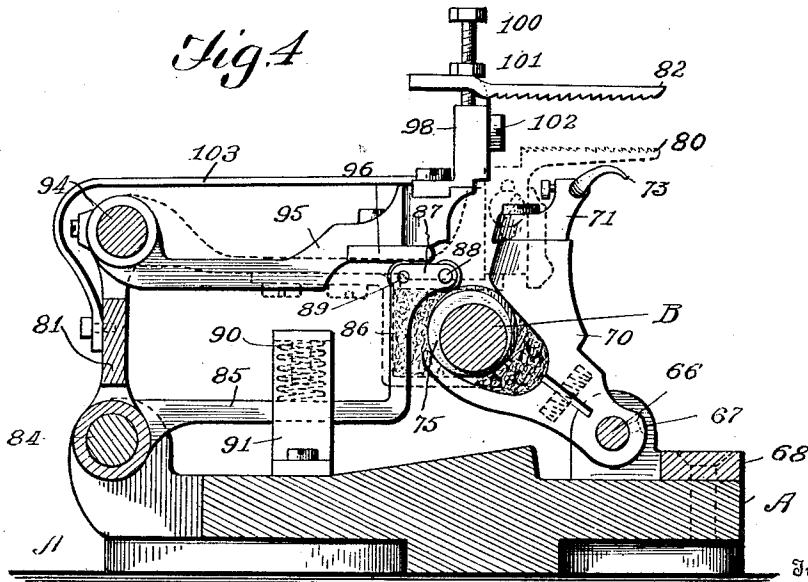
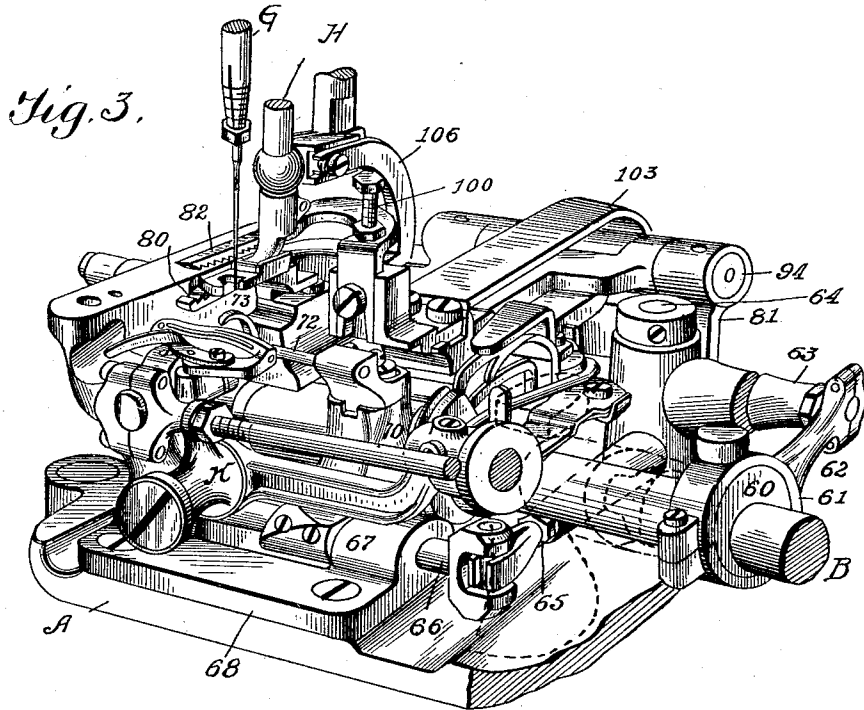
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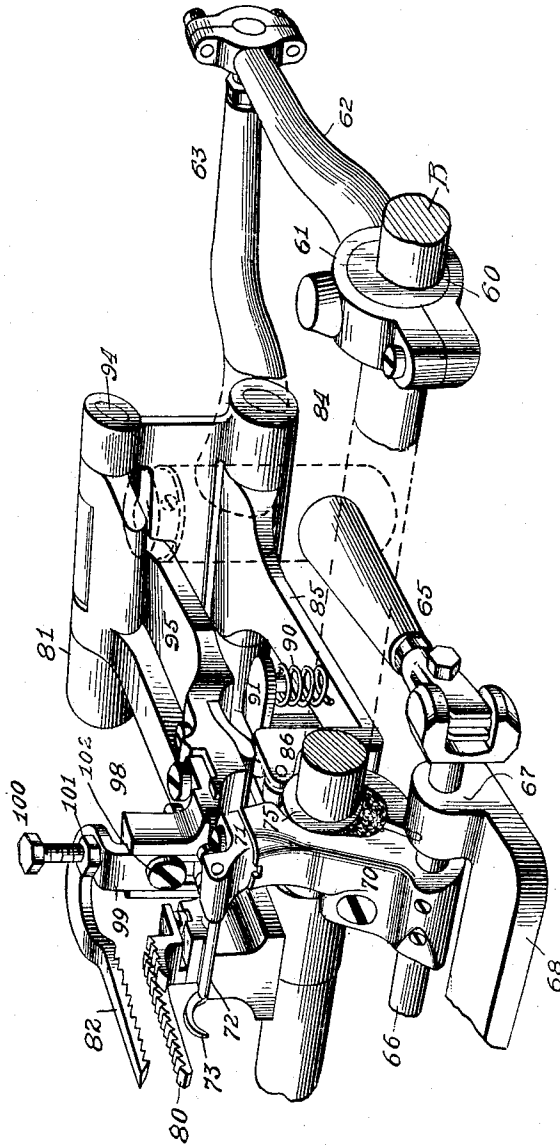
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7 SHEETS-SHEET 4.

Fig. 5.



Witnesses

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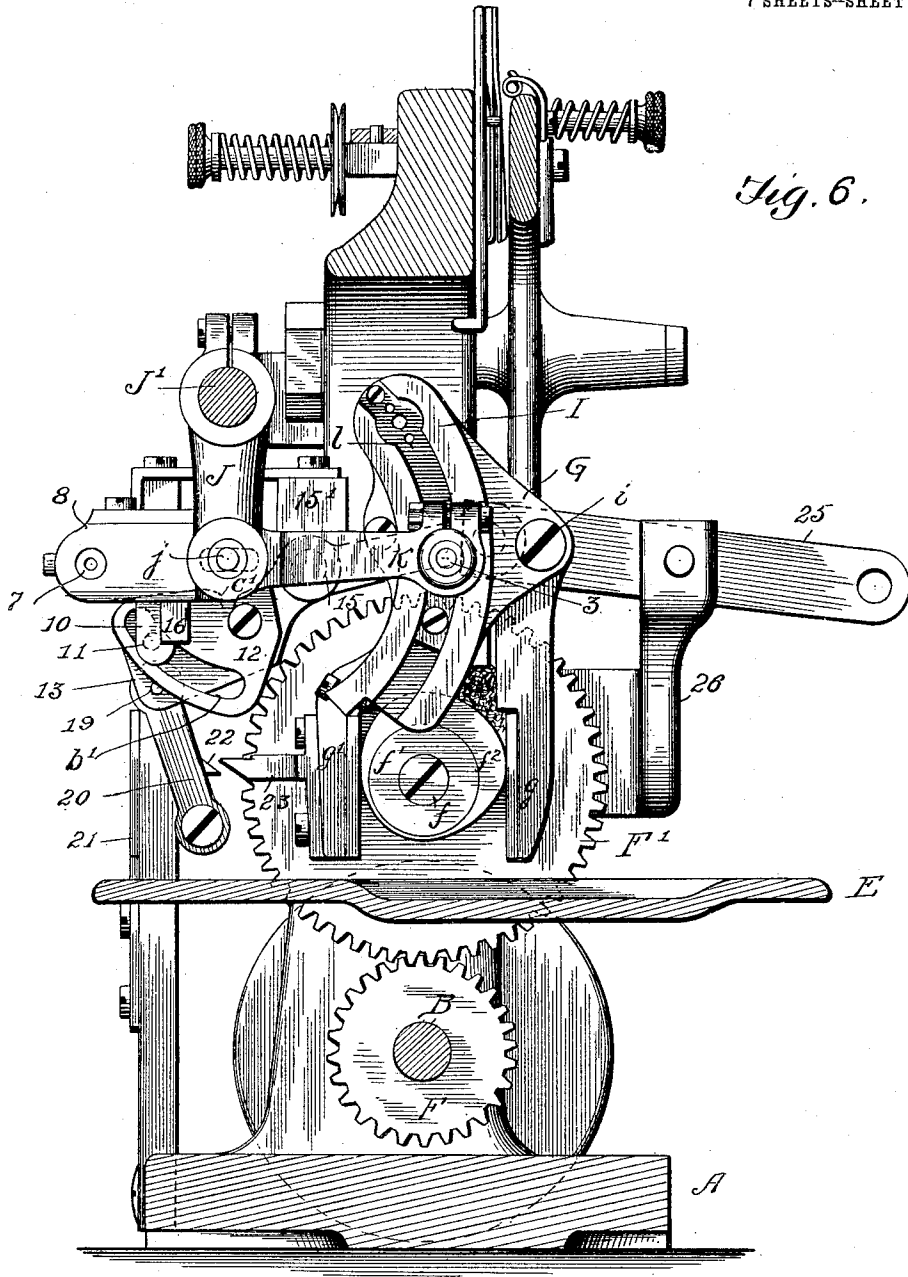


Fig. 6.

Witnesses

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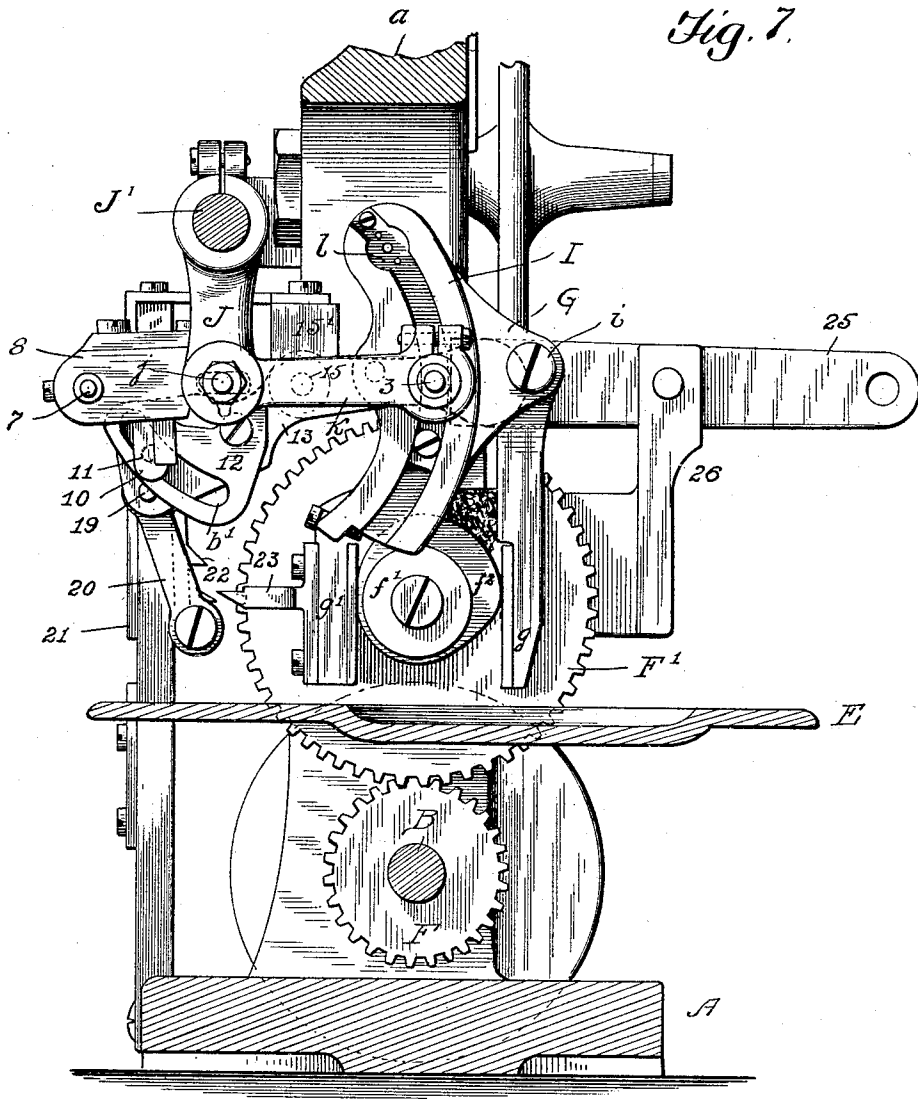
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Witnesses
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7 SHEETS—SHEET 7.

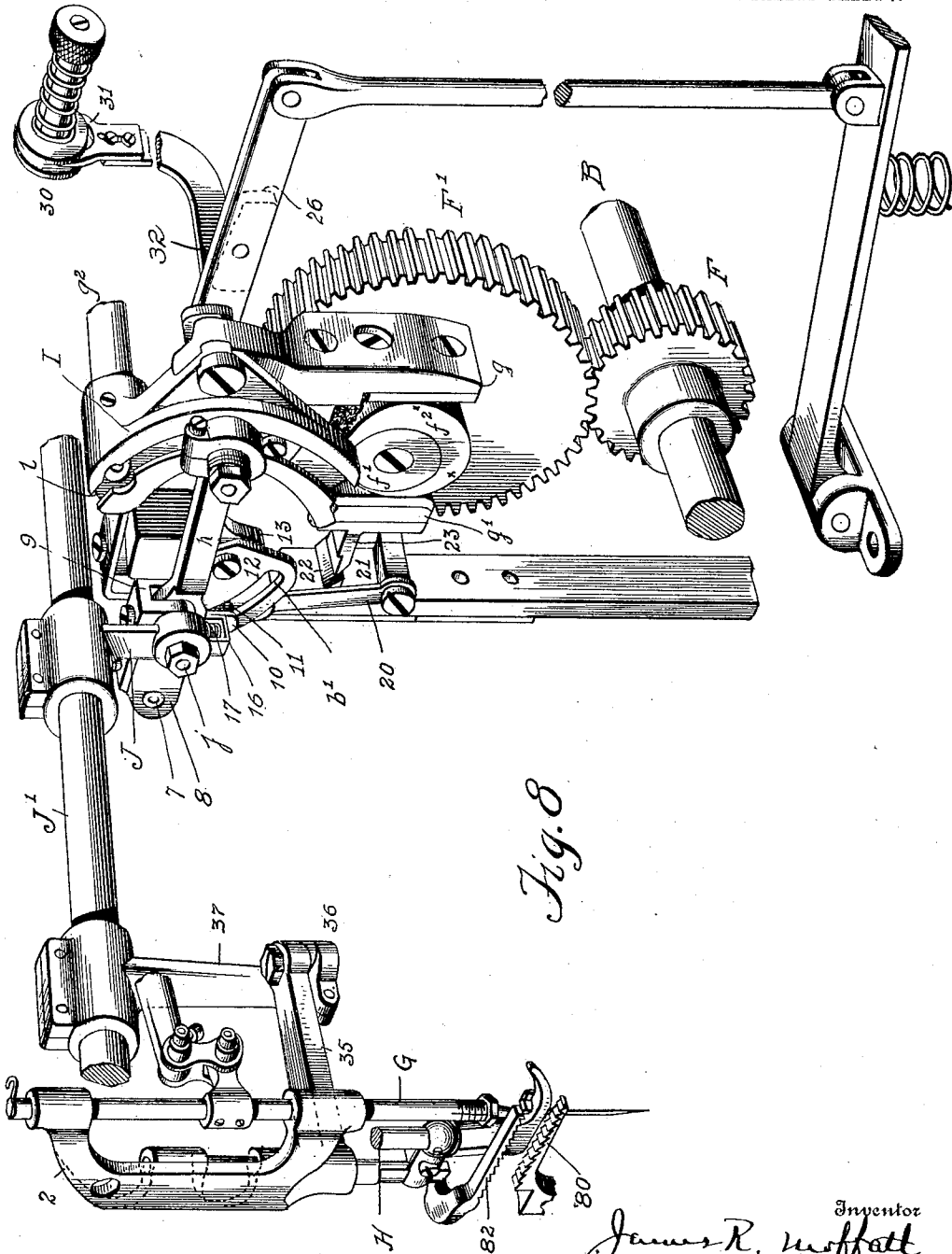


Fig. 8.

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UNITED STATES PATENT OFFICE.

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ZIGZAG, STRAIGHTAWAY, STITCH SEWING-MACHINE WITH TOP FEED.

1,109,635.

Specification of Letters Patent.

Patented Sept. 1, 1914.

Application filed November 28, 1905. Serial No. 289,488.

To all whom it may concern:

Be it known that I, JAMES R. MOFFATT, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Zigzag, Straight-away, Stitch Sewing-Machines with Top Feed, of which the following is a description, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon.

The present invention relates to improvements in machines for sewing straight-away and zig zag stitches of the chain type, shown, described and claimed in Letters Patent of the United States, granted Russel G. Woodward on the 23rd day of February, 1904, No. 753,187, and on the 9th day of June 1908, No. 890,582. It has been found in the use of machines of the above type, for closing the uppers of boots and shoes, that it is desirable to employ a top feed to co-act with the usual under feed, and the principal object of the present invention is to provide the machine with a top feed and to so arrange the operating mechanism thereof as to avoid interfering with the operating mechanism of any of the usual parts of the stitch-forming mechanism.

The invention consists of the matters hereinafter described and referred to in the appended claims.

The invention is illustrated in the accompanying drawings, in which,

Figure 1 is a rear elevation of a sewing machine embodying the invention; Fig. 2 is an end elevation of the same, drawn on a somewhat larger scale; Fig. 3 is a detail perspective view of the stitch-forming mechanism below the cloth plate and the mechanism for operating the top and bottom feed; Fig. 4 is a transverse sectional view of a portion of the machine, showing the manner in which the top feed is actuated from the loop detainer operating cam; Fig. 5 is a detail perspective view, illustrating more particularly the upper and lower feeds and the mechanism for operating the same; Fig. 6 is a vertical section of the machine, showing the adjustment of the parts when arranged for zig zag sewing; Fig. 7 is a view similar to Fig. 3, showing the adjustment of the parts for the formation of straight-away

stitches; and Fig. 8 is a detail perspective view of the mechanism for changing the character of the stitch.

In these drawings, A represents the base of the machine, in which rises an arm *a*, carrying at its head *a'* the usual parts of the machine, such as the presser bar and the swinging needle bar carrying gate or frame 2.

B represents the main shaft, which at its rear end carries the belt wheel B'. On this shaft is secured a pinion F, the teeth of which intermesh in those of the gear wheel F', this mechanism forming a part of and being similar to the mechanisms described and claimed in the hereinbefore mentioned Letters Patent and applications, and being designed for the purpose of transmitting vibratory movement to the needle bar carrying gate in the formation of zig zag stitches, or for holding said gate stationary during straight-away sewing.

The outer end of the shaft is provided with an enlarged circular head *f'*, forming a guide and support for a cam *f*², that is secured to and rotates with the gear wheel F'. The cam *f*² is of the contour clearly shown in Figs. 6 and 7, that is, three-cornered, and rotates between and in working contact with the two arms *g*, *g'*, of a frame G, hung on a pivot stud *g*², carried by the arm *a*, the movements of the cam being transmitted to said arms, and effecting an oscillatory movement of the frame. To the frame G is secured, by screws *i*, a segment I having a curved slot *l* therein, the center of which is at times slightly eccentric to a pin *j*, carried by the lower end of a rocker arm J, depending from and rigidly secured to a rock shaft J', from which movement is imparted to the swinging needle bar gate or frame 2, in the manner hereinafter described.

K represents a bar or link having at its front end a split head embracing a stud 3, which is adjustable up and down in a curved slot *l*, to vary the amount of throw of the rock shaft J'. This bar or link K has a longitudinal slot for the passage of the pin *j*. At the rear end of said bar or link K is a pin 7, on which is pivoted a frame 8, which has at its forward end side forks 9, embracing the pin *j* on the arm J. When these forks embrace the pin *j*, a swinging of segment I

imparts oscillatory movement to the rock shaft J' . Projecting downwardly from the pivoted frame 8 is a lug 10, having at its lower end a pin 11, adapted to fit in a curved slot b' , formed in a plate 12, the latter being 5 screwed or otherwise secured to a plate 13, that is pivoted upon a stud 15 secured to the bracket 15' on the machine frame.

The two plates 12 and 13 are recessed at 10 c' , so that when thrown upward, they engage the pin j on the arm J , and thus hold the rock shaft from oscillation when the pivoted frame 8 is out of engagement therewith. The pivoted frame 8 is normally 15 pressed downward by means of a spring 17 seated in the yoke 16 forming a part of the frame 8, and the upper end of said spring bears against the under side of the bar K . The plate 13 is pivoted at 19 to a link 20, the lower end of which is pivoted to a vertical slidable block 21, having on its inner side a projection 22, that cooperates with a projection 23 on the frame G , in order to prevent movement of the block 21, except when 25 the cam f^2 is in a certain position, this being timed so that the cam will only assume this position as the needle is just about to enter the goods.

As above stated, by adjusting the stud 3 30 up or down the curved slot l , the amount of lateral throw of the needle is varied. In adjusting this, the pivoted frame 8 is also adjusted.

The plates 12 and 13 are mounted on the 35 frame of the machine, and, therefore, remain in proper relation to the pin j for all adjustments of the link K . The slot b' is formed about the pin j as a center, and in adjusting the link K the pin 11 will move 40 in the slot b'' as the link K turns about the pin j as a center. The plate 13 has a forwardly projecting arm d' , that is connected to the lever 25, which is pivoted to a bracket 26 on the machine frame, the lever being in 45 suitable operative connection with a treadle, and being normally elevated by a spring (see Fig. 8), leaving the plates 12 and 13 in engagement with the pivot pin j , so that the machine will sew straight-away, but 50 when the lever 25 is pulled downward, the parts are shifted to cause the pivoted frame 8 to engage the pin j , and thus oscillatory movement will be imparted to the rock shaft J' , and, therefore, zig zag movement is at- 55 tained.

Assuming the parts to be in the position shown in Fig. 4, the pin j is locked in the recesses c' of plates 12 and 13, so that no 60 swinging of the needle bar gate or frame or frame 8 is out of engagement with the pin j , and the usual straight-away sewing is accomplished by the machine.

The bar K , by reason of the slot therein, 65 slides back and forward with respect to the

pin j , which passes through said slot. To shift to zig zag sewing, the operator pulls down on the lever 25, moving the same to the position shown in Fig. 6. This tilts the cam plates 12 and 13, moving down the 70 slide block 21, and forcing the pivoted frame 8 into engagement with the pin j . When the frame 8 is locked to the pin j , the reciprocatory movement of the bar K is transmitted to the frame J , thus oscillating the 75 rock shaft J' , and through it imparting lateral movement to the needle. It will be understood that the pivoted frame 8, cannot be forced entirely into engagement with the pin j until cam f^2 has pulled the projection 80 23 out of line with the projection 22, which happens when the needle is on its descent and about to enter the goods. The width of the zig zag line for stitching may be regulated by adjusting the bolt or stud 3 in the 85 curved slot l . In practice, it has been found desirable to use a cam f^2 of the shape shown. This three-cornered cam gives the necessary time for the change from one style of stitching to the other, as the fork is at rest be- 90 tween the points on the cam marked with stars. All the switching of the mechanism takes place while the cam moves from one star to the other.

On the front of the arm A are arranged 95 two tension members 29 and 30, each comprising a pair of disks having flared edges and arranged to receive the thread, the latter passing between both sets of disks, and the retarding effect of both tension mem- 100 bers being exercised thereon during the straight-away stitching operation. During the formation of zig zag stitches, however, less tension is required, and provision is made for automatically releasing the tension 105 30. For this purpose, a wedge plate 31 is adjustably secured to the upper end of an arm 32 that passes through a suitable guide block secured to the arm A . The lower end of the arm 32 is pivotally connected to the 110 lever 25, so that when the lever is operated for the purpose of changing the mechanism for the production of zig zag stitches, the wedge plate will be forced between the disks constituting the tension member 30, and the 115 thread will no longer be retarded as it passes through said disks. When changing to straight-away stitching, the wedging member is withdrawn, and the tension members act in the usual manner. 120

The swinging gate 2, which carries the needle bar is of a type common to a well known Union special overseaming machine, the rear portion of the gate being provided with an arm 35, that is connected by a link 125 36 to the rocker arm 37, on the forward end of the rock shaft J' , as shown in Fig. 1. At the front or head of the machine is arranged a needle bar G , a presser bar H , a feed dog, and the usual mechanism for 130

transmitting motion thereto; these latter portions being arranged, as usual, below the cloth plate E. In connection with this mechanism is employed a movable loop detainer for detaining the loop of the needle thread on the looper and holding it back out of the way, as clearly set forth in Letters Patent of the United States, granted to Russel G. Woodward, on July 12th, 1904, No. 765,120. Referring particularly to this mechanism, 60 designates a cam or eccentric carried by the main shaft B, and embraced by an eccentric strap 61, from which extends a rod 62 which is connected at its outer end to the arm 63, of a bell crank lever, of which the central portion forms a sleeve, and is pivoted on a stud 64, supported on the bed of the machine. The other arm 65 of the bell crank lever is connected to one end of a sliding and rock shaft 66, adapted to suitable bearings formed in lugs 67 on the standards 68, secured to the bed of the machine, a sliding movement of the shaft being transmitted to it from the main shaft B through the bell crank lever and connections described. The connection between the arm 65 of the bell crank lever and shaft is such as to permit free rocking movement of said shaft. Secured to the rock shaft, between the bearings thereof, is the lower end of a loop detainer carrying frame 70, to the top of which is adjustably secured a head 71, the latter being provided with a horizontal socket for the reception of the end of a loop detainer 72, said loop detainer having a beak 73, that extends toward the front of the machine. The body portion of the frame 70 is recessed for the reception of an actuating cam 75 that is secured to the main shaft B, so that as the shaft is rotated the loop detainer carrying frame will be rocked with the shaft 66 as a center, and will be slid to and fro as the shaft 66 receives motion from the bell crank lever 63. The mechanism is such that the loop detainer has four motions—a bodily forward motion in the direction of the length of the shaft 66, an oscillating movement at practically right angles thereto, which movement is in the direction of the length of the beak of the loop detainer, then a bodily movement, reverse of the first movement, and finally an oscillating movement the reverse of the second movement;—the movements being properly timed with respect to the movement of the looper, so that the loops of the needle thread entered by the looper will be held back on the looper, or forced back thereof by the detainer until such time as the needle point on its next descent has passed below the point of the looper, and all danger of the needle cutting off its own thread is avoided.

rocking frame as well as the construction and operation of the take-up parts is practically the same as set forth in the Letters Patent No. 765,120, hereinbefore referred to, and the method of operation of the take-up, the looper and the loop detainer is the same as described in said Letters Patent.

The lower feed dog 80 is supported and receives motion from the rocker arm 81, in the usual manner. The present machine, however, includes a top feed dog 82, which receives motion partly from the feed rocker 81, and partly from the cam 75, which oscillates the loop detainer.

Mounted on the lower pivot pin 84 of the rocker frame is an arm 85, that extends toward the front of the machine and has an upturned end portion 86, that is split to form a plurality of parallel plates 87, these plates being provided with openings for the reception of two sets of anti-friction rollers 88 and 89. The plates are curved forward to extend partly over the cam or eccentric 75, and the rollers 88 bear against the upper rear portion of said eccentric, so that as the latter rotates the arm 85 will receive a rocking movement with the axis of the shaft or spindle 84 as a center. The upward movement of the arm is resisted by a spring 90, that extends between the upper face of the arm 85, and the overhanging portion of a bracket 91, the base of which is secured to the bed plate.

Pivoted to the upper pin 94 of the rocker frame is an arm 95, that projects over the second set of rollers 89, and is provided with a wear plate 96, for engagement with said rollers, the wear plate sliding to and fro over the rollers, as indicated by the movement of the rocker frame 81. The upper portion of the arm 95, carries a laterally adjustable block 98, which has a vertical slot for the reception of the vertically adjustable shank 99 of the upper feed dog 82, the vertical position of the dog being adjusted by a set screw 100, and the lock nut 101, and a set screw 102 being employed to hold said dog in any position to which it may be adjusted. The upper arm 95 is held down in engagement with the rollers 89, by means of a leaf spring 103, the rear end of which is secured to the rear face of the feed rocker frame 81, while the forward free end of the spring bears against the top of the arm 95.

The upper feed dog is approximately U-shaped in form in order that it may be curved around the rear of the presser foot H, and secured to the lower portion of the presser bar is a hook-shaped arm 106, the lower end of which is bent forward under the rear end of the top feed dog, so that when the presser foot is elevated the top feed dog will also be raised in order to free the work. This upward movement of the

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top feed dog is resisted by the spring 103, which normally holds the arm 95, down against the rollers 89.

It will be seen that the feed dogs while receiving horizontal movement from the same rocker, are independently operated, so far as vertical movement is concerned, and that the operating mechanism of the upper dog is such as to permit the ready raising and lowering of such dog with the presser foot.

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

1. The combination with a work support, of a feeding mechanism comprising a feed bar, a feed dog carried thereby and overhanging the work support, means for reciprocating said bar horizontally, and means for raising and lowering said feed bar, including a pivoted arm, an eccentric engaging the free end of said arm, and means carried by the free end of said arm for engaging said feed bar; substantially as described.

2. The combination with a work support, of a feeding mechanism comprising a feed bar, a feed dog carried thereby and overhanging the work support, means for reciprocating said bar horizontally, and means for raising and lowering said feed bar, including a pivoted arm, an eccentric engaging the free end of said arm, means carried by the free end of said arm for engaging said feed bar, and a spring for holding said feed bar in engagement with said arm; substantially as described.

3. The combination with a work support, of a feeding mechanism, a feed dog overhanging the work support and acting on the upper surface of the material, an eccentric and means to operate it, an arm in engagement with said eccentric and pivoted to a stationary center, a second arm pivoted to a moving center, means to swing said center, means carried by said first named arm for engaging and lifting said second arm and means to hold said arms in engagement with one another; substantially as described.

4. A sewing machine including in combination, a needle, a feed dog overhanging the work support, and acting upon the material, an eccentric, means for operating the eccentric, an arm engaging said eccentric for imparting vertical movement to the feed dog, said arm being pivoted to swing up and down about a fixed center, a rocking frame, a second arm pivoted to said rocking frame, and adapted to be moved up and down by the first-named arm, said feed dog being carried by said second arm, the pivotal connection between the arm and said rocking frame being over the pivotal connection of the first arm, said pivotal connections being

on the same side of the needle, substantially as described.

5. In a feeding mechanism, a feed dog acting on the material, an eccentric, an arm in engagement with said eccentric and pivoted to a stationary center, means to hold said arm in engagement with said eccentric, a second arm having vertical motion imparted to it from the first arm and being pivoted to a moving center, and means moving bodily with said second arm to hold it in engagement with the first arm; substantially as described.

6. In a sewing machine, a feed dog, means for operating the same, a second feed dog, a feed bar supporting said second feed dog, means for reciprocating said feed bar horizontally, and means for raising and lowering said feed bar, including an eccentric, and devices intermediate said eccentric and feed bar, on which said feed bar freely rests, whereby said feed bar may be raised from said devices; substantially as described.

7. In a sewing machine, a feed dog, means for operating the same, a second feed dog, a feed bar supporting said second feed dog, means for reciprocating said feed bar horizontally, and means for raising and lowering said feed bar, including an eccentric, and devices intermediate said eccentric and feed bar, on which said feed bar freely rests, whereby said feed bar may be raised from said devices, and a spring for holding said feed bar in contact with said devices; substantially as described.

8. The combination with a work support, of feeding mechanism including a feed dog overhanging said work support and engaging the upper surface of the material, a feed bar, an eccentric, a device intermediate said eccentric and said feed bar on which said feed bar freely rests, whereby said feed bar may be raised from said device, and means for reciprocating said feed bar.

9. The combination with a work support, of feeding mechanism including a feed dog overhanging said work support and engaging the upper surface of the material, a feed bar, an eccentric, a device intermediate said eccentric and said feed bar on which said feed bar freely rests, whereby said feed bar may be raised from said device, means for reciprocating said feed bar, means for holding said feed bar in contact with said device, and means for raising said feed bar.

10. A feeding mechanism having a feed bar, a feed dog carried thereby, means for reciprocating said feed bar, and means for raising and lowering the same including an eccentric, a pivoted arm, a roller carried by the free end of said arm and engaging said eccentric, and a second roller carried by the free end of said arm on which said feed bar rests; substantially as described.

11. A feeding mechanism having a feed bar, a feed dog carried thereby, means for reciprocating said feed bar, and means for raising and lowering the same including an eccentric, a pivoted arm, a roller carried by the free end of said arm and engaging said eccentric, and a second roller carried by the free end of said arm on which said feed bar rests, a spring moving with said feed bar and holding the same in contact with said roller; substantially as described.

12. In a machine of the class described, the combination with the lower feed dog, of a presser foot, an upper feed dog partly encircling the rear of the presser foot, and a hooked arm depending from the presser bar and arranged to engage with the rear portion of the top feed dog; substantially as described.

13. In a sewing machine, a work support a top feed dog overhanging said work support, a support therefor, means for reciprocating said dog in an approximately horizontal plane, and a vertically movable member on which said support is slidably mounted and means for raising said feed dog from said movable member; substantially as described.

14. In a sewing machine, a work support a top feed dog overhanging said work support, a movable member for imparting vertical movement thereto, and a dog-carrying arm arranged to reciprocate in an approximately horizontal plane, said arm resting upon and being movable independently of said member and means for raising said feed dog from said movable member; substantially as described.

15. In a sewing machine, a work support a top feed dog overhanging said work support, a pivotally mounted arm arranged for oscillatory movement in a vertical plane, a cam for operating said arm, a rocking frame, and a feed dog carrying arm pivoted to said frame and resting on said pivotally mounted arm; substantially as described.

16. In a sewing machine, a top feed dog, a pivotally mounted arm arranged for oscillatory movement in a vertical plane, and having an upwardly extending portion at its free end, rollers journaled in the upper portion of the arm, a cam acting on one of said rollers to impart movement to the arm, a rocking frame, and a feed dog carrying arm pivoted to said frame and resting on said rollers; substantially as described.

17. In a sewing machine, a work support a top feed dog overhanging the work support, and engaging the upper surface of the material, a rocking frame, a feed dog carrying arm having one end pivoted thereto, a vertically movable member on which the free end of the arm rests, and a spring for holding the arm down in engagement with said member; substantially as described.

18. In a sewing machine, a top feed dog, a pivotally mounted arm arranged for oscillatory movement in a vertical plane, and having an upwardly extending portion at its free end, a plurality of rollers journaled in the upper portion of the arm, a cam acting on one of said rollers to actuate the arm, a rocking frame, a feed dog carrying arm having one end pivoted to the frame and provided at its free end with a wear plate resting on one of said rollers, and a spring secured to the rocking frame and bearing on said dog carrying arm; substantially as described.

19. In a machine of the class described, the combination with stitch-forming mechanism, including a loop detainer, of an operating cam therefor, a lower feed dog, a presser foot, and a top feed dog receiving vertical motion from the actuating cam of the loop detainer and means for reciprocating said top feed dog; substantially as described.

20. In a machine of the class described, the combination with the main shaft, of a cam thereon, a bottom feed dog, a feed dog rocker frame connected thereto, a top feed dog, an arm pivoted at the upper portion of the rocker frame and connected to said top feed dog, a second pivoted arm arranged under the first arm and provided at its forward end with a plurality of anti-friction rollers with one of which the upper arm engages, and a cam mounted on the main shaft and engaging a second anti-friction roller; substantially as described.

21. In a machine of the class described, the combination with a main shaft of a cam thereon, a feed rocker frame, a pivoted arm extending transversely with respect to the machine and having an upbent forward end a plurality of anti-friction rollers carried by the end of said arm, one of said rollers being arranged to be engaged by the cam, a spring tending to depress said arm, an upper arm pivoted to the feed rocker frame, a wear plate carried by the upper arm and resting against the second anti-friction roller, an adjustable block carried by the upper arm, and a top feed dog adjustably secured to said block; substantially as described.

22. In a sewing machine, a feed dog, a feed bar carrying said feed dog, a rocking frame to which said feed bar is pivoted, means for vibrating said rocking frame for moving said feed dog back and forth, a second feed dog, a feed bar carrying said second feed dog, said second feed bar being pivoted to said rocking frame, an eccentric for raising and lowering said second feed bar, a pivoted arm on the free end of which said second feed bar rests, said arm engaging said eccentric whereby said arm is moved up and down.

23. In a sewing machine, a feed dog, a feed bar carrying said feed dog, a rocking frame to which said feed bar is pivoted, means for

vibrating said rocking frame, for moving
 said feed dog back and forth, a second feed
 dog, a feed bar carrying said second feed
 dog, said second feed bar being pivoted to
 5 said rocking frame, an eccentric for raising
 and lowering said second feed bar, a pivoted
 arm on the free end of which said second
 feed bar rests, said arm engaging said ec-
 centric whereby said arm is moved up and
 10 down, a spring for holding said arm in con-
 tact with said eccentric and a second spring
 for holding said second feed bar in contact
 with said arm.

24. In a sewing machine, a feed dog, a
 15 feed bar carrying said feed dog, a rocking
 frame to which said feed bar is pivoted,
 means for vibrating said rocking frame for
 moving said feed dog back and forth, a sec-

ond feed dog, a feed bar carrying said sec-
 ond feed dog, said second feed bar being 20
 pivoted to said rocking frame, an eccentric
 for raising and lowering said second feed
 bar, a pivoted arm on the free end of which
 said second feed bar rests, said arm engag-
 ing said eccentric, whereby said arm is 25
 moved up and down, a bowed spring rigidly
 connected with said rocking frame and hav-
 ing its free end resting upon said second feed
 bar for holding the same in contact with said
 arm. 30

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

JAMES R. MOFFATT.

Witnesses:

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 A. CLOTHIER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents
 Washington, D. C."