

G. M. EAMES.
 SEWING MACHINE.
 APPLICATION FILED DEC. 22, 1908.

979,451.

Patented Dec. 27, 1910.
 5 SHEETS—SHEET 1.

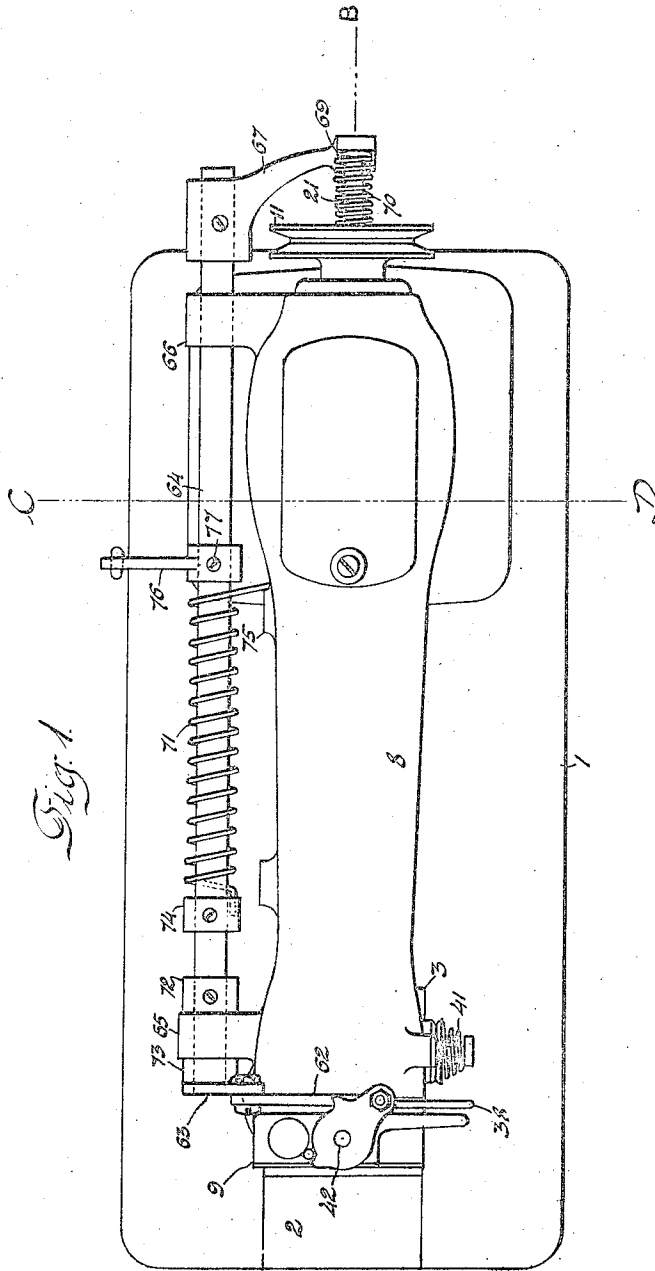


Fig. 1

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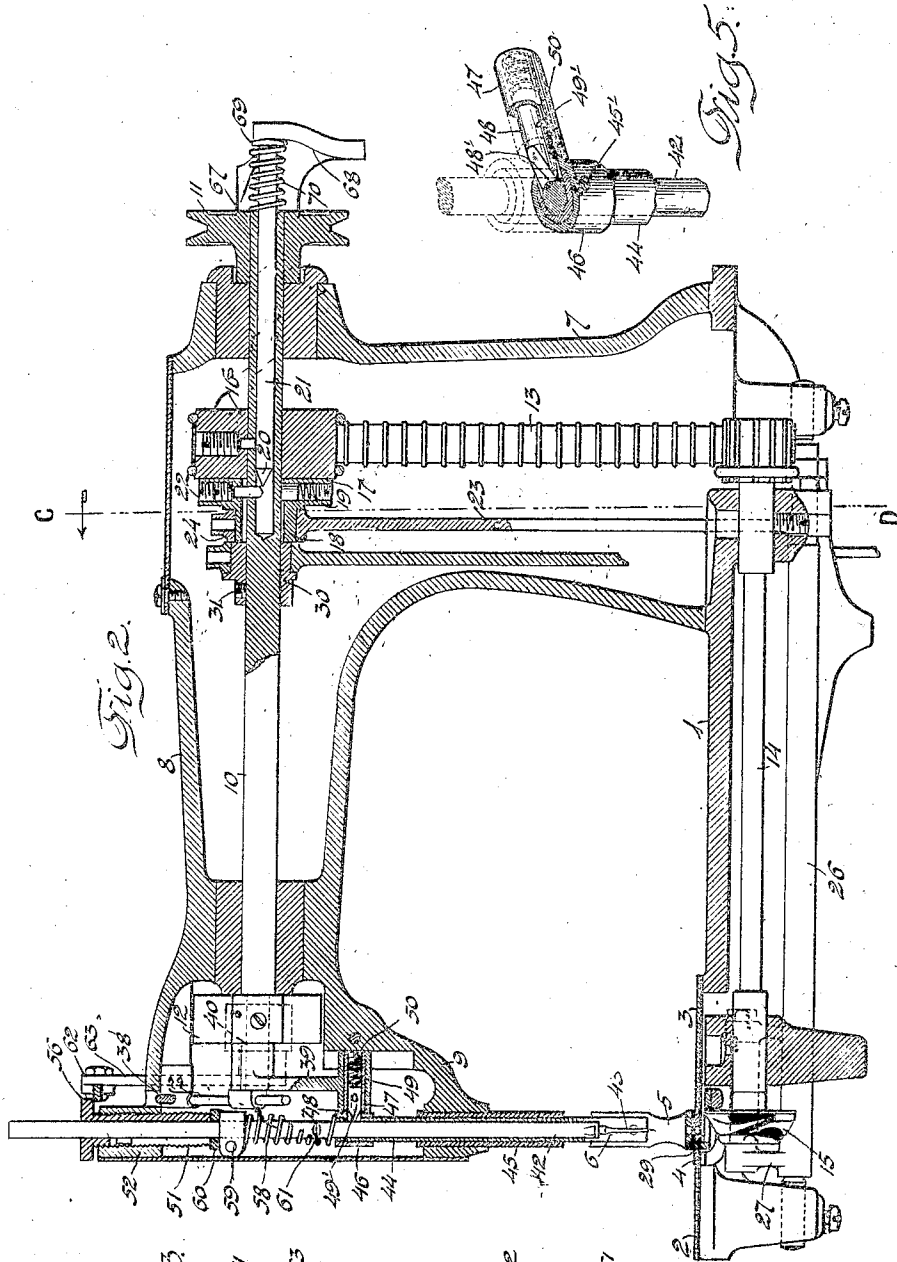
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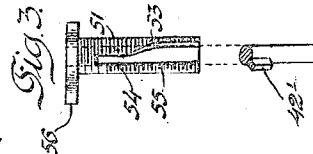
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6 SHEETS—SHEET 3.



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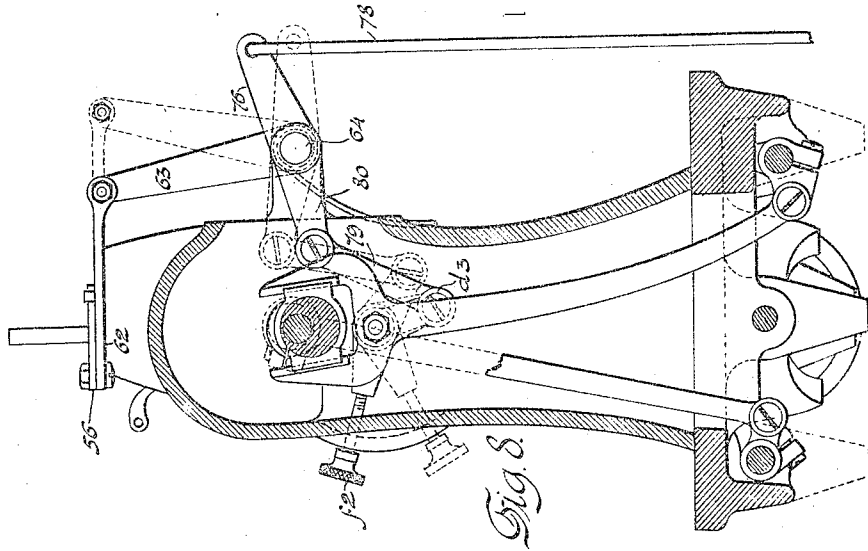


Fig. 8.

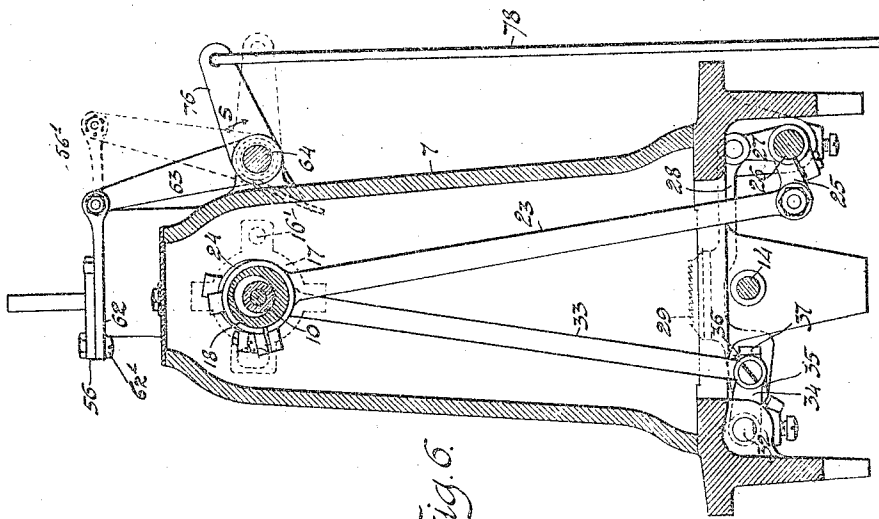


Fig. 6.

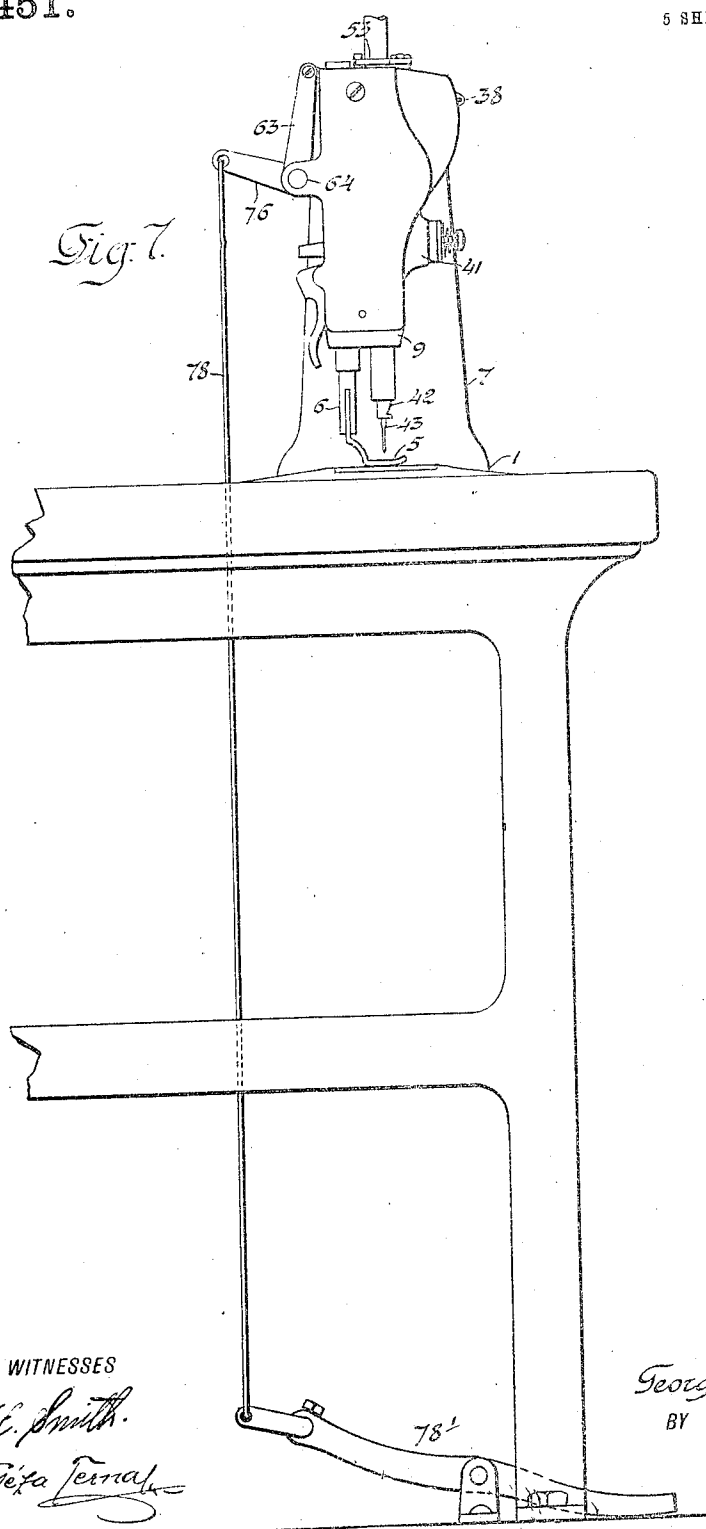
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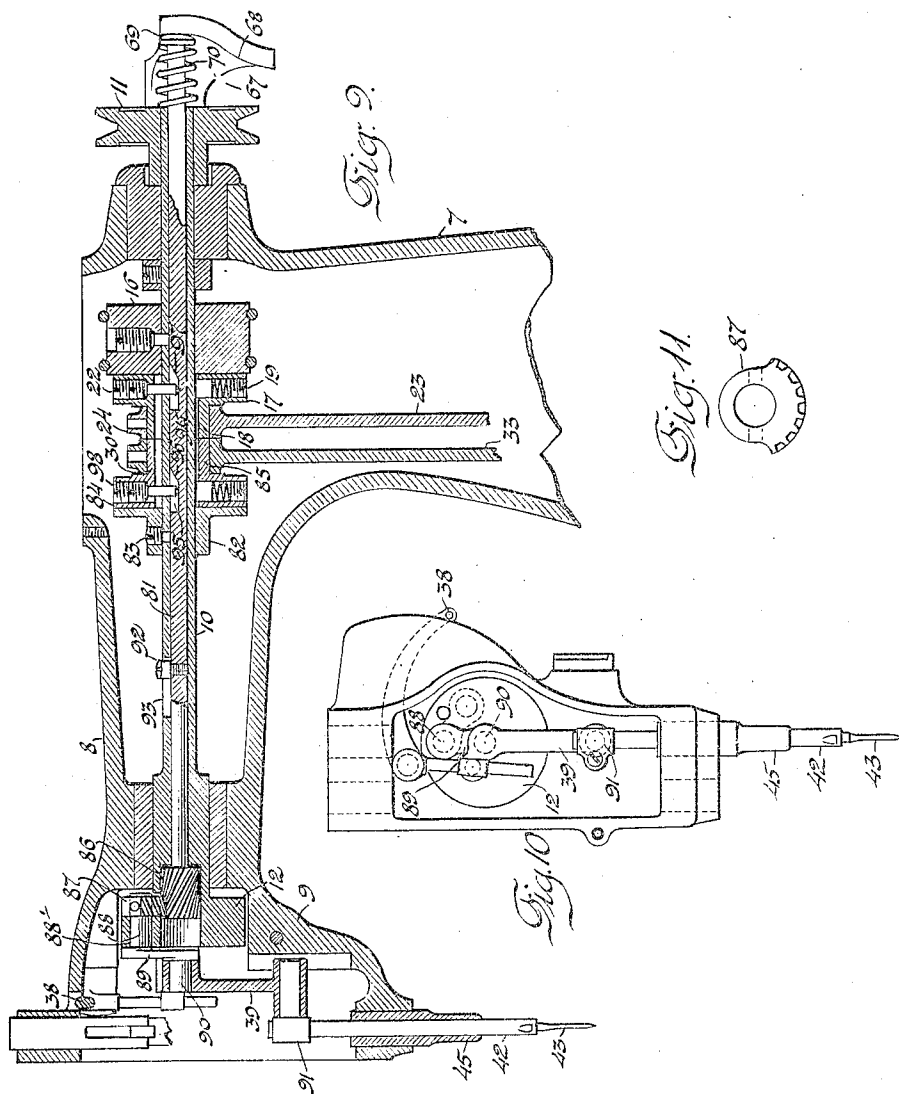
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GEORGE M. EAMES, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

979,451.

Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed December 22, 1908. Serial No. 468,713.

To all whom it may concern:

Be it known that I, GEORGE M. EAMES, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut; have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in sewing machines, and has for its object to control the movements of certain parts of the stitch-forming mechanism and at the same time suspend the feed of the material being acted upon without arresting the action of the entire stitch-forming and cloth-feeding mechanism.

It has been common in connection with sewing machines operated by other than manual power to employ a power transmitting device located between the main or driving shaft of the sewing machine and the source of power, thus making it necessary to suspend the movement of all the operative parts comprising the stitch-forming and cloth-feeding mechanism when, for any purpose, it is desired to discontinue the seam formation. Further, the use of the commonly employed transmitter in connection with high speed sewing machines frequently results in a disarrangement of the coacting members and often causes the smaller connections to become bent or broken, due to the shock of suddenly overcoming the excessive inertia incident to the operation of high speed machines.

Referring to the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is a plan view of a sewing machine equipped with my improved mechanism. Fig. 2 is a view in front side elevation, partially in section, to better illustrate the application of my invention. Fig. 3 is a detail view of the needle-bar cam sleeve. Fig. 4 is a detail view of a portion of the needle-bar. Fig. 5 is a view in perspective of the needle-bar link collar. Fig. 6 is a view in cross section on the lines C—D, Figs. 1 and 2. Fig. 7 is a front end elevation of a sewing machine and a portion of the work table, also showing the foot treadle and the connections for operatively connecting it with the machine. Fig. 8 is a view, partially in cross section, illustrating the application

of my invention to a sewing machine equipped with a cloth-feeding and cloth-feed-adjusting mechanism wherein the step-by-step feed movements are produced by an eccentric fast on the main driving shaft, instead of by an eccentric adjustable relatively to the axis of said shaft as in the construction of the application. Fig. 9 is a view, mainly in section, of the overhanging arm of the sewing machine, showing a modified form of construction for suspending the needle actuation and controlling the movements of the feed-dog. Fig. 10 is a front end elevation of the overhanging arm shown in Fig. 9. Fig. 11 is a detail view later to be referred to.

1 is the bed-plate of the sewing machine, 2 and 3 the front and back slide plates, respectively, 4 the throat-plate, 5 the cloth-presser, 6 the cloth-presser bar, 7 the arm standard, 8 the overhanging arm, 9 the head carried by said arm, and 10 the main shaft or needle-bar driver provided at one end with the belt pulley 11 and carrying at its opposite end the flange 12. 13 is a belt for operatively connecting the shaft 10 with the loop-taker driving shaft or carrier 14 having at its forward end the loop-taker 15.

The belt pulley 16 carried by the shaft 10 has pivoted to it by a screw 16' (shown in dotted lines only, Fig. 6) an oscillating disk 17 which has formed integral with it a feed-cam or hub 18. The adjustment of said disk and hub is controlled by a spring 19 which yieldingly holds said hub in a position concentric with the axis of the shaft 10, the tapered portion 20 of the feed-adjusting member 21 acting on the inner end of the screw 22, in opposition to the resiliency of the spring 19, to position said hub eccentrically to the axis of said shaft, in the manner and for the purpose set forth in United States Patent No. 718,988, dated January 27, 1903, to W. F. Dial *et al.*, to which reference may be had, wherein the hub 18 is referred to as an "eccentric".

23 is a feed eccentric connection, the upper end of which is operatively connected with the hub 18 by an eccentric strap 24, while its lower end is connected by an arm 25 with the feed rock-shaft 26 carrying the arm 27, said arm in turn being pivoted to the feed-dog carrying bar 28 provided with the feed-dog 29, thus connecting said hub with said feed-dog.

The feed-lift eccentric 30 is secured by screw 31 to the shaft 10 and is connected with the feed-lift rock-shaft 32 by the eccentric connection 33 and arm 34, the forward end of said shaft being provided with an arm 35 carrying a slide block 36 which moves in the opening 37 formed in the feed-dog carrying bar 28, whereby the feed-dog 29 is caused to be moved vertically into and out of contact with the material being stitched.

38 is the needle-thread take-up, 39 the needle-bar link connected at its upper end by a stud 40 (shown in dotted lines only) with the flange 12, and 41 the needle-thread tension.

Referring now to the parts more directly connected with my improved mechanism, 42 is the needle-bar provided with a cam lug 42' and carrying the needle 43, said bar at its lower end being mounted in a tubular portion 44 which in turn is mounted to move vertically in the bushing 45 secured in the downwardly extended portion of the head 9. To the upper end of the tubular portion 44 is secured, by screw 45', the needle-bar link collar 46 having an extended hollow portion 47 on which is pivoted the lower end of the link 39. The extended portion 47 has mounted in it a plunger 48 which is pointed at one end and provided with a concaved portion 48' which rides the surface of the needle-bar when said bar is at rest. A spring 49 acts to resiliently hold said plunger in the direction of the needle-bar, the opposite end of said spring abutting against a screw 50 threaded into the opening 47. The plunger 48 is provided with a guide pin 49' which enters a slot 50' in the extended portion 47.

The upper end of the needle-bar 42 passes through the needle-bar cam sleeve 51 which is threaded into the head 9, as shown at 52, so as to oscillate therein, said sleeve being provided with a cam portion 53, vertical slot 54, vertical wall 55 and flange 56.

Encircling the needle-bar is a spring 58 which bears at one end on the collar 46 while its opposite end bears against the collar 59 carried by said needle-bar, a cushion washer 60, which in the present instance is made of felt, being also carried by said needle-bar at the opposite side of the collar 59.

61 represents a notch, formed in the needle-bar, which at the will of the operator contacts with the plunger 48 to produce stitch-forming movements of the needle 6, as will be hereinafter more fully explained.

The link 62 is connected at one end, by pivot bolt 62' with the flange 56 and at its opposite end, by pivot bolt 56' with a lever 63 fast on the forward end of the prime member or shaft 64 of the controlling mechanism, said shaft being mounted to oscillate in bearings 65 and 66 formed on the rear side of the head of the overhanging arm

and arm standard respectively. The shaft 64 is provided at its opposite end with a stitch-regulating lever or arm 67 having an inclined portion 68 which coacts with a bevel head 69 formed integral with the feed-adjusting member 21, a spring 70 normally holding the tapered portion 20 of said member out of engagement with the screw 22, while a spring 71 normally holds the notch 61 out of engagement with the plunger 48.

The collar 72 fast on the shaft 64 acts, in connection with the head 73 of the lever 63, to hold said shaft against endwise movement. The shaft 64 also carries a collar 74 in which one end of the spring 71 is mounted, the opposite end of said spring bearing against a hub 75 formed on the overhanging arm, said spring being torsioned to hold in their normal positions the several parts operatively connected with the oscillating shaft 64.

The treadle lever 76 is secured by a screw 77 to the shaft 64, and is connected by a rod 78 to a foot treadle of ordinary construction, secured in the usual manner and capable of being conveniently manipulated by the operator.

The operation of my improved mechanism is as follows:—Supposing, as represented by the drawings, that the stitch formation and feed actuation have been suspended by bringing the needle-bar to rest and adjusting the hub 18 to a position concentric with the axis of the shaft 10, all the other elements being operative as when forming a seam, and it is desired to resume the stitch formation, the operator by manipulating the foot treadle causes the shaft 64 to be rocked in the direction indicated by the arrow 8, while the connections 62, 51 and 42' cause the notch 61 to be brought into operative relationship with the plunger 48, thereby giving to the needle 6 its stitch-forming movements. At the time that the notch 61 is brought into operative relationship with the plunger 48, the incline 68 of the lever 67, through its connection with the shaft 64, acts upon the beveled head 69 of the member 21, thus causing the tapered portion 20, through its action upon the screw 22, to position the hub 18 eccentrically to the axis of the shaft 10, thereby giving to the feed-dog 29 its movements for advancing the material to the action of the stitch-forming mechanism.

When it is desired to suspend the stitch formation and feed actuation, the operator reverses the action of the foot treadle, and consequently the action of the connections 62, 51, 42' and the incline 68, thereby permitting the spring 58 to position the needle-bar as shown in Fig. 1, the spring 70 returning the member 21 to the position shown in the same figure.

While the spring 71 is desirable, it is not

essential to the practical operation of the machine, its function being simply to protect the shaft 64 against accidental rocking movement in the direction indicated by the arrow *s*, or in a direction to position the notch 61 in line with the plunger 48 and the bevel portion 20 of the member 21 in operative relationship with the screw 22. Should the notch 61 be disconnected from engagement with the plunger 48 before the needle-bar reaches its highest position, the spring 58 will force the lug 42' in contact with the cam portion 53 of the sleeve 51, and position the needle-bar at its upward limit of stroke with the lug 42' in the slot 54, thereby holding said bar against accidental operative engagement with the plunger 48 until it is again rotated through the oscillating movements of the shaft 64, it being understood that when the needle-bar is at rest and the hub 18 is adjusted concentrically with the axis of the shaft 10, the material being stitched is free to be removed from under the cloth-presser or adjusted as may be required.

From the nature of the construction it will be readily understood that the sleeve 51 and member 21 are subject to adjustment at any time during the stitch formation, but should said sleeve be adjusted in a direction to disconnect the notch 61 from the plunger 48 while the needle is in the material, the needle-bar will remain in its stitch-forming position, owing to the plunger 48 being seated in the notch 61, until the action of the cam portion 53 on the lug 42' forces the needle-bar to follow the adjustment of said sleeve.

In the modified form of construction shown in Fig. 8, I have illustrated my invention as applied to a sewing machine equipped with a feed-actuating mechanism wherein the extent of the step-by-step feed movements is controlled by the adjustment of suitably arranged levers, as pointed out in United States Patent to Miller & Diehl, No. 229,629, dated July 6, 1880, for sewing machine, to which reference may be had. But instead of adjusting the fulcrum point d^3 by manipulating the thumb-screw f^2 , I connect said fulcrum point with the shaft 64 by a link 79 and arm 80, the latter being formed integral with the lever 76, thus effecting the adjustment of the fulcrum point d^3 by the oscillating movements of the shaft 64 in the same manner and to the same extent as through the manipulation of the thumb-screw f^2 .

In Figs. 9, 10 and 11 I have shown a modified form of construction wherein the movements of the needle-bar and feed-dog are governed by a rod 81 mounted in the main driver 10, said rod being adjustable in the direction of its length. 82 represents a flange secured by a screw 83 to the shaft

10, said flange having pivotally mounted upon it, in the same manner as the disk 17 is adjustably secured to the side of the pulley 16, a disk 84 provided with a hub 85 corresponding to the hub 18, said hub 85 being controlled in its adjustment relatively to the axis of the shaft 10, in the same manner as is the hub 18. Thus it will be seen that duplicate constructions of like adjustment have been provided for controlling the movements of the feed-lift connection 33 and feed-eccentric connection 23.

Upon the forward end of the rod 81 is secured a spiral gear 86 which meshes with a segment of a spiral gear 87 secured to the arm 88 of the crank 89, said arm being mounted to turn in an opening 88' formed in the flange 12. The crank 89 is also provided with an oppositely arranged arm 90 upon which is mounted in the usual manner the commonly employed needle-bar link 39, the opposite end of said link being connected with the needle-bar by the commonly employed needle-bar collar 91.

Threaded into the rod 81 is a guide screw 92, the head of which tracks in a slot 93 formed in the main driver. 94 and 95 are complementary notches, having like inclines 96 and 97 which are caused to act upon the respective screws 98 and 22 when the rod 81 is adjusted in a direction to suspend the action of the needle-bar and feed-dog.

In the modified form of construction referred to, if the stitch-forming and cloth-feeding mechanisms are in operative relationship with the driving mechanism and it is desired to suspend the stitch formation and feed actuation, the operator, through the treadle 78', connecting rod 78, lever 76 and shaft 64, moves the incline 68 of the lever 67 upward in opposition to the resiliency of the spring 70, thus forcing the rod 81 forward and at the same time causing the hubs 85 and 18, through the action of the inclines 96 and 97 upon the respective screws 98 and 22, to be moved to a position concentric with the axis of the shaft 10, thus bringing the feed-dog to rest; and at the same time the spiral gear 86 acts upon the segment 87 and positions the crank 89 as shown in full lines, Fig. 10, with the axis of the arm 90 in line with the axis of the shaft 10.

It is to be understood that in the construction represented by Figs. 9, 10 and 11, the parts shown in the other figures for connecting the rock-shaft 64 with the needle-bar have been dispensed with.

What I claim is:—

1. In a sewing machine, the combination of stitch-forming mechanism including a needle-bar, an actuating mechanism therefor and an adjustable connection for determining the action and inaction of said needle-bar relatively to its actuating mechanism; cloth-feeding mechanism including adjust-

able coacting members for determining the action and inaction of the feeding mechanism relatively to its cloth-feeding movements; and controlling mechanism comprising a prime member operatively connected with the needle-bar and the cloth-feeding mechanism for determining the aforesaid actions and inactions of the needle-bar and feeding mechanisms, the adjustment of said prime member determining the time and extent of the seam formation, substantially as described.

2. In a sewing machine, the combination of stitch-forming mechanism comprising a needle-bar, a main driver, and connections for operatively connecting said needle-bar with said driver, said connections including coacting parts adjustable into and out of power transmitting relationship with each other during the stitch-forming movements of said driver; cloth-feeding mechanism comprising a feed-cam, a feed-dog and connections for operatively connecting said cam with said dog, said feed connections comprising coacting members adjustable relatively to each other for determining the action and inaction of said feed-dog relatively to its feed movements; and controlling mechanism comprising a prime member operatively connected with both the needle-bar and cloth-feeding mechanisms, the adjustment of said prime member determining the time and extent of seam formation, substantially as described.

3. In a sewing machine, the combination of an actuating shaft, needle actuating and feed actuating members upon said shaft, stitch-forming members including a needle operatively connected with the needle actuating member of said shaft, and feeding mechanism operatively connected with said feed-actuating member, and controlling means acting simultaneously upon said stitch-forming and feeding mechanism operated independently of said shaft whereby the stitch-formation and feed are simultaneously suspended without arresting the movement of said shaft.

4. A sewing machine comprising a main-driver, a needle-bar, connections for operatively connecting said bar with said driver including coacting members adjustable into and out of power transmitting relationship with each other, a feeding mechanism and a stitch-forming and feed-controlling mechanism; said feeding mechanism comprising a feed-cam; a feed-dog and connections for operatively connecting said cam with said dog including a feed rock-shaft adjustable into and out of driving relationship with said main-driver; and said controlling mechanism comprising a prime member for controlling the action and inaction of both the needle-bar and the feeding mechanism; the

adjustment of said prime member thus determining the extent of the seam formation.

5. A sewing machine comprising a main driver, a needle-bar, connections for operatively connecting said bar with said driver including coacting parts adjustable into and out of power transmitting relationship with each other, a loop-taker, a loop-taker carrier operated from said driver, a feed-cam carried by said driver, and adjustable in a direction transverse to the axis of said driver, a feed-dog operatively connected with said feed-cam, a rock-shaft operatively connected with both the needle-bar and the feed-cam, the adjustment of said rock-shaft in one direction causing the needle-bar to be positioned at rest and the axis of said cam to be positioned in line with the axis of said main driver, thus discontinuing the stitch-formation and feed actuation during the continued operation of the main driver, substantially as described.

6. A sewing machine comprising a main-driver, a needle-bar, connections for operatively connecting said bar with said driver including coacting members adjustable into and out of power transmitting relationship with each other, a feeding mechanism and a stitch-forming and cloth-feed controlling mechanism; said feeding mechanism including adjustable coacting members for determining the action and inaction of the feeding mechanism relatively to its cloth-feeding movements; said controlling mechanism comprising a prime member operatively connected with the needle-bar and cloth-feeding mechanisms for determining the aforesaid actions and inactions of the needle-bar and feeding mechanisms, the adjustment of said prime member determining the time and extent of the seam formation.

7. A sewing machine comprising a needle-carrying bar, means for operating said bar including a main driver and coacting parts adjustable into and out of power transmitting relationship with each other during the stitch-forming movements of said driver; a feed-dog and means for operating it including a feed-cam; a loop-taker and means for operating it including a loop-taker carrier; stitch-forming and cloth-feed controlling mechanism including a prime member operatively connected with both the needle-bar and feed-cam, the connections for connecting said prime member with said needle-bar including a cam sleeve mounted in the head of the overhanging arm, and a coacting cam lug carried by the needle-bar; the said connections including an arm, carried by said prime member, and a feed-adjusting member, substantially as described.

8. A sewing machine comprising a needle-carrying bar, means for operating said bar including a main driver and coacting parts which are adjustable into and out of power

transmitting relationship with each other during the stitch-forming movements of said driver, one of said coacting parts being provided with a wedge shaped end having a
 5 concave portion for coacting with said needle-bar when said bar is at rest; a feed-dog and means for operating it including a feed-cam; a loop-taker and means for operating it including a loop-taker carrier; and stitch-
 10 forming and cloth-feed controlling mechanism including a prime member operatively connected with both the needle-bar and feed-cam, the connections for connecting said prime member with said needle-bar includ-
 15 ing a sleeve provided with a cam portion

which in connection with a lug carried by the needle-bar acts to suspend the stitch-forming movements of the needle, the connections for connecting said prime member with said feed-cam including an arm, car- 20 ried by said prime member, and a feed-adjusting member, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE M. EAMES.

Witnesses:

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