

J. P. WEIS.
DIFFERENTIAL FEEDING MECHANISM FOR SEWING MACHINES.
APPLICATION FILED MAY 29, 1905.

971,230.

Patented Sept. 27, 1910.

3 SHEETS-SHEET 1.

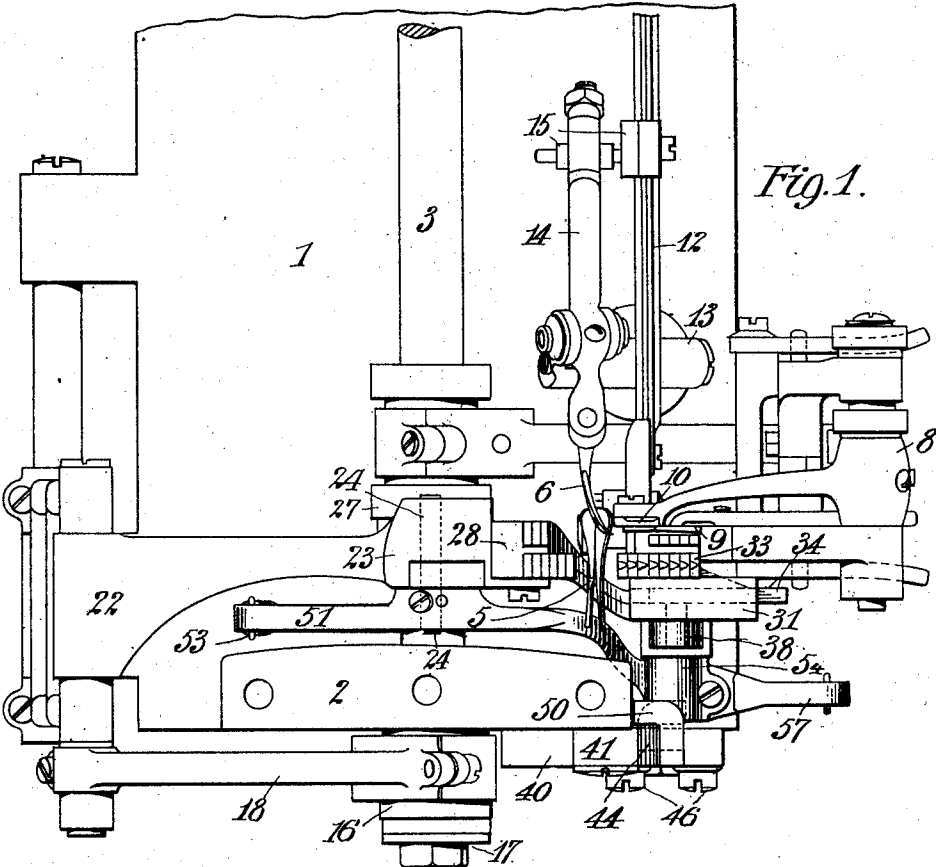


Fig. 1.

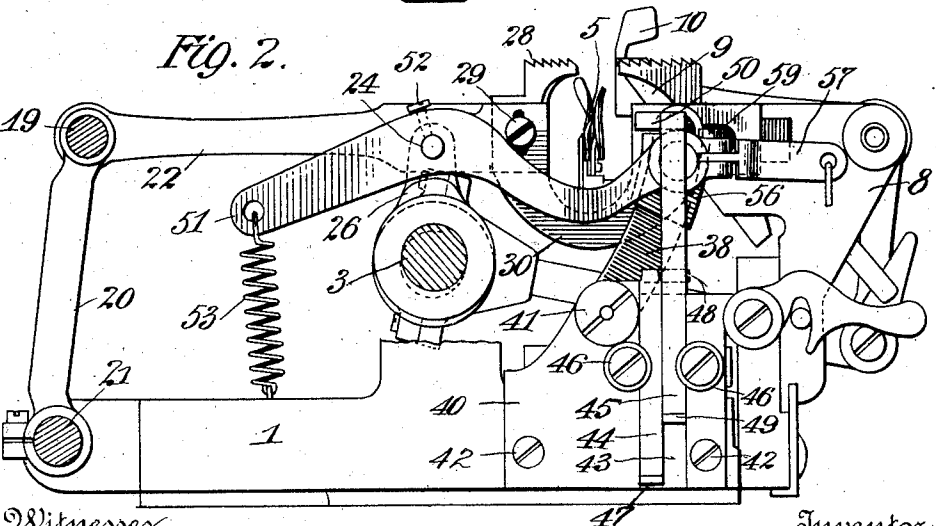


Fig. 2.

Witnesses
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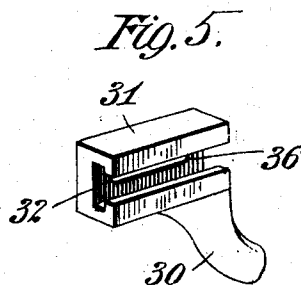
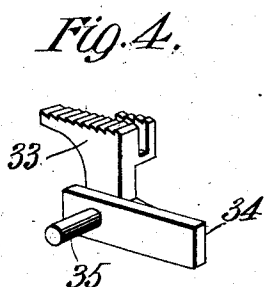
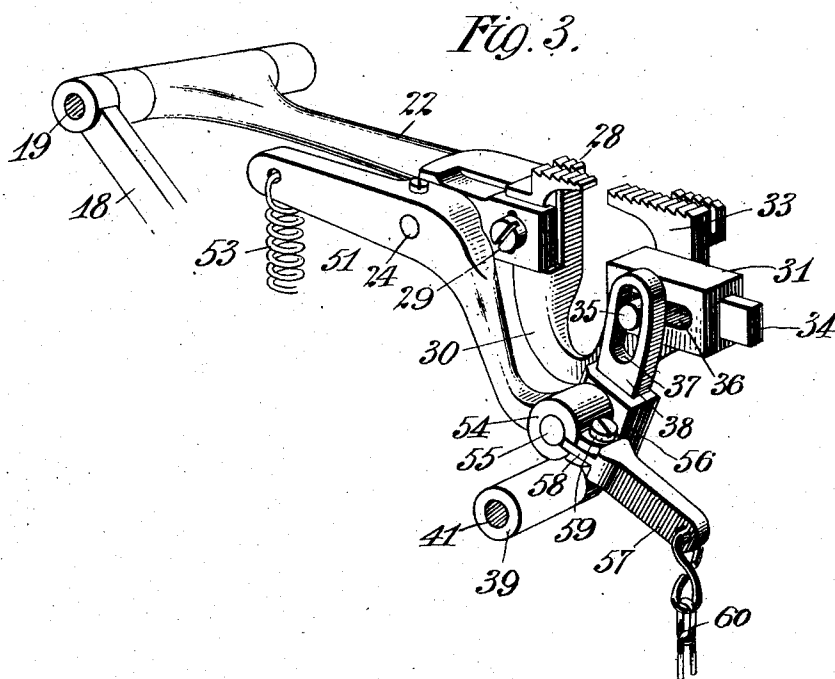
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By his Attorney
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3 SHEETS—SHEET 3.

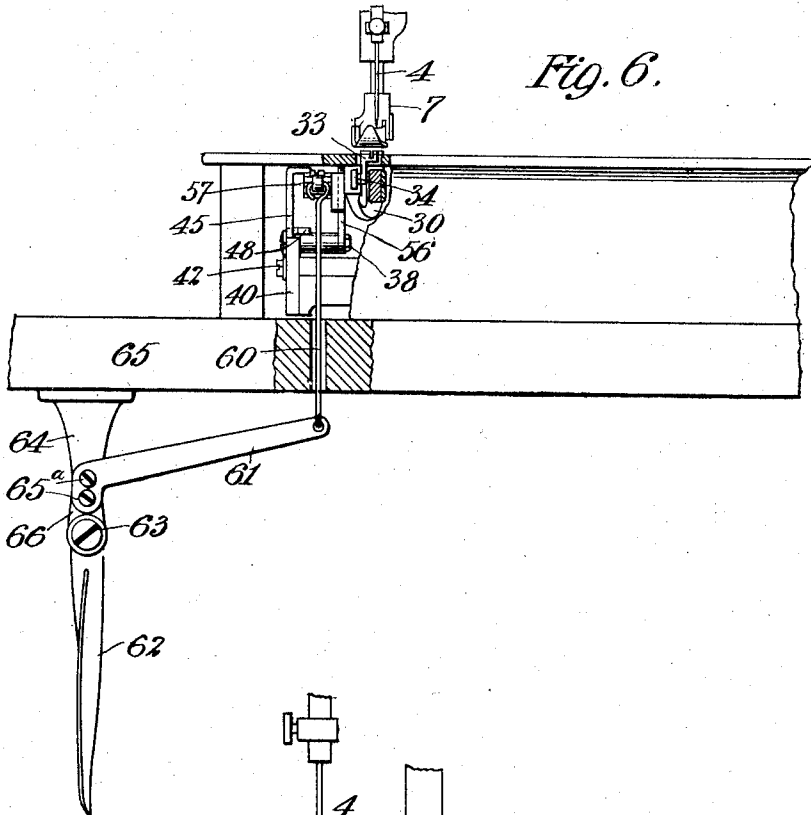


Fig. 6.

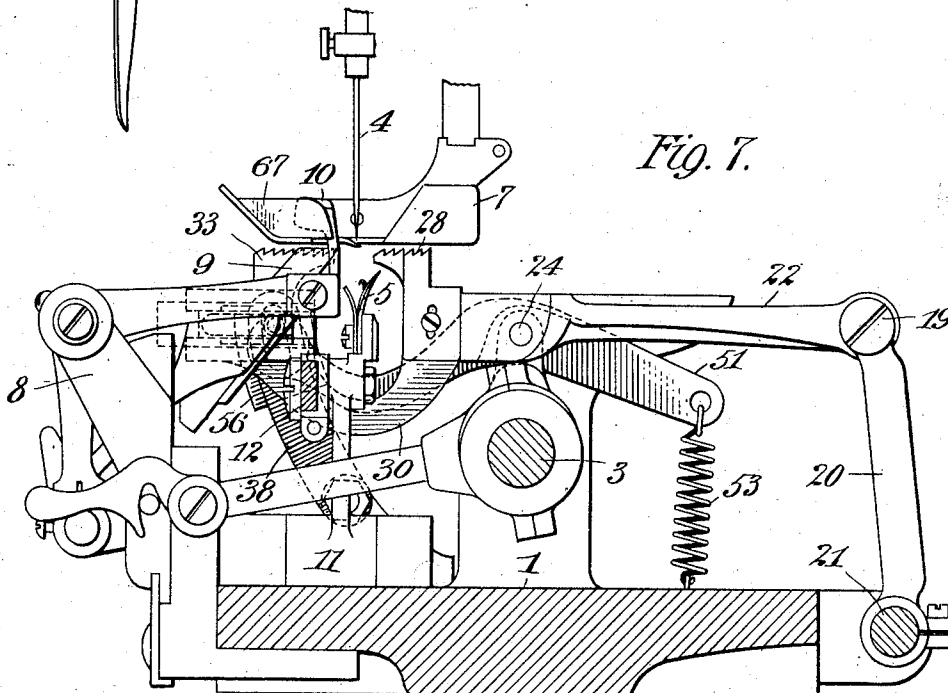


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOHN P. WEIS, OF NYACK, NEW YORK, ASSIGNOR TO METROPOLITAN SEWING MACHINE COMPANY, OF NYACK, NEW YORK, A CORPORATION OF NEW YORK.

DIFFERENTIAL FEEDING MECHANISM FOR SEWING-MACHINES.

971,230.

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

Application filed May 29, 1905. Serial No. 262,811.

To all whom it may concern:

Be it known that I, JOHN P. WEIS, a citizen of the United States, residing in Nyack, county of Rockland, and State of New York, have invented a new and useful Improvement in Differential Feeding Mechanism for Sewing-Machines, of which the following is a description.

This invention relates to sewing machines and has particular reference to the feeding mechanism thereof.

Among the objects of this invention may be noted the following: to provide a feeding mechanism by means of which the material traversed to and from the stitch-forming mechanism may be fed with greater or less speed up to the stitch-forming mechanism than beyond the same; to provide a feeding mechanism by means of which the work may be puckered, shirred or crimped at the stitching point so as to give to the edge of the work a rounded or curved form; to provide a feeding mechanism by means of which the above objects may be accomplished and which is convertible into a feeding mechanism capable of traversing the work with uniform speed to and from the stitch-forming mechanism; to provide a feeding mechanism by means of which the work may be fed with greater or less speed up to the stitch-forming mechanism and traversed from such mechanism with uniform speed, whereby to obtain various effects in the body of the work or upon the edge thereof; to provide a feeding mechanism which, during the operation of the machine and without affecting the stitch-forming mechanism, may be adjusted and regulated so as to traverse the work with greater or less speed to the stitch-forming mechanism, and without affecting the uniformity of travel of said work from the stitch-forming mechanism; to provide a feeding mechanism in combination with an overedge stitch-forming mechanism whereby varied conditions of the edge of the work may be produced and retained by the overedging threads; to provide a feeding mechanism of differential character in combination with the stitch-forming and edge-trimming mechanism, whereby the edge of the work may be trimmed and overedged and the work differentially fed during the operation of the machine without affecting the stitching and trimming mechanisms;

and to provide a feeding mechanism by means of which, and during the operation of the machine, extremes of adjustment may be obtained instantly so as to produce varying effects with absolute uniformity.

Other objects will be displayed during the course of this description, and with them all in view, together with those above enumerated, the invention consists in the parts, features and combinations of elements hereinafter described and claimed.

In the drawings accompanying this description, only so much of an overedging and trimming machine has been portrayed as is deemed necessary to illustrate the disposition and construction of the parts constituting the invention, and in said drawings: Figure 1 is a top plan view of the forward end of the bed-plate of a sewing machine showing the feeding mechanism, trimming mechanism and under stitch-forming devices, the cloth-plate being removed for the purpose; Fig. 2 is a front end elevation and partial section of Fig. 1, the section being produced by breaking away the standard which supports the cloth-plate and in which the driving-shaft is journaled in order to clearly portray the feeding mechanism, the driving-shaft being in section, as also the journals of the feed-rocker; Fig. 3 is a perspective view, showing in detail the feed-bar and the mechanism by means of which the auxiliary dog may be manipulated; Fig. 4 is a perspective view of the differential feed-mechanism; Fig. 5 is a perspective of the guide-head for the auxiliary feed-dog; Fig. 6 is a front elevation partially in section of the forward end of the machine and its supporting table, showing the manner in which the feeding mechanism may be controlled by the operator from below the bed-plate; and Fig. 7 is a vertical sectional view showing the opposite side of the mechanism of Fig. 2, the presser-foot and needle being shown in this view in order to convey an idea of the juxtaposition and coöperation of the stitch-forming mechanism, presser-foot, trimmer and feeding mechanism.

In the drawings, the numeral 1 indicates the frame of the machine, 2 the forward standard thereof which supports the forward end of the cloth-plate and in which the forward end of the driving-shaft 3 is journaled, and the extreme forward end of

which shaft extends beyond said standard and has applied thereto the devices for imparting longitudinal or feed movements and for regulating the latter. The needle is indicated at 4, the looper at 5, the spreader at 6, the presser-foot at 7, and the trimming mechanism is generally indicated by the numeral 8. The trimming mechanism consists of various parts which are not detailed in this specification, inasmuch as the same do not pertain to the invention hereof, the only matter essential to the latter being the general location, disposition and coöperative relation of parts of the trimming mechanism relatively to the stitch-forming and feeding mechanisms. But it may be noted that this trimming mechanism is in all material respects substantially the same as that shown in my application Serial Number 160,208, filed June 5, 1903. It may be stated, however, that the trimming mechanism includes a lower stationary or ledger-blade 9 and an upper reciprocating blade 10, both blades being located close to one side of the auxiliary feed-dog of the feeding mechanism and in advance of the overedging and close to the point of engagement of the said feed-dog with the work.

The type of stitch-forming mechanism shown is not essential to this invention and may be sufficiently described to consist of the needle, looper and spreader already indicated, the looper having an oscillating movement on an axis at the point 11 and being driven by a mechanism including the pitman 12; and the spreader having a movement derived from longitudinal and vertical reciprocations, resulting in carrying the spreader up through the cloth-plate, over the edge of the work and forward to the stitching position, the spreader having a pivotal support on an axis in the frame 13 and deriving its movements from the connection of its carrier 14 to the pitman 12 by the means generally illustrated at 15. The needle is given a vertical reciprocation in any ordinary manner. The important feature, as regards this invention, in connection with the stitch-forming mechanism, resides in the particular disposition of the needle, spreader and looper, or of the needle and looper, thereof relatively to the feed and the trimmer.

The feeding mechanism is of the four-motion variety, being given its vertical rise and fall and its longitudinal reciprocations in alternation by any approved means, that shown being made the subject-matter of my Patent Number 922,646, granted May 25, 1909. Hence, the details of this particular actuating mechanism will not be set forth herein, certain of the parts only being referred to.

Viewing Fig. 1, it will be noted that the forward end of the driving-shaft 3 carries

any suitable feed-adjusting means 17, the pitman 18 extending therefrom being pivotally connected at 19 to the feed-rocker 20 journaled in the bed-plate at 21, said rocker having pivotally connected to it at its top the feed-bar 22 having at its forward end the enlarged head 23, to which is pivotally connected, by means of the pin 24, the upper end of a strap 26 surrounding an eccentric 27 carried by the driving-shaft 3. The forward end of the head 23 carries the main feed-dog 28, which may be vertically adjusted in any usual manner, as by means of the screw 29. The head 23 of the feed-bar,—referring particularly to Fig. 3,—is provided with the forwardly extending yoke 30 which may be applied to the feed-bar in any manner desired, but being shown as integral therewith. The outer free end of the yoke 30 is provided with the guide-head 31, in the groove 32 of which the auxiliary feed-dog 33 slides and is guided and supported, said dog being connected to, or made integral with, the slide 34 which operates in the groove 32 of the head 31. The slide 34 is provided with the pin 35 which may be screwed therein or otherwise detachably secured thereto, said pin 35 extending through the longitudinal slot 37 of the rocking arm or lever 38, journaled at its lower end in the bearing 39 of the bracket 40 by means of the laterally extended pin 41. The bracket 40 is rigidly secured to the forward end of the bed-plate or frame 1, see Figs. 1 and 2, by means of the screws 42, and said bracket is provided in its face with a vertical groove 43 in which closely fit, side-by-side, two adjustable stop-bars 44 and 45, said bars being held in said groove and firmly set in adjusted position by means of the screws and washers 46. The bar 44 is provided at the bottom with the lug 47 by means of which it may be manipulated, and at its top is provided with the angular, laterally extending stop 48; while the bar 45 is provided at its bottom with the manipulating lug 49 and at its top with the laterally extending stop 50.

Pivoted to the front side of the head 23 of the feed-bar is the lever 51,—pin 24 providing, if desired, the pivotal connection,—screw 52 being tapped through the top of the lever into engagement with said pin 24. The rear end of the lever has connected to it, in any suitable manner, one end of a strong, coiled spring 53, the other end of which is suitably connected to the bed-plate of the machine, the normal tendency of said spring being to depress the rear of the lever 51 and elevate the forward end thereof. At its forward end, again viewing Fig. 3, the lever 51 is bowed into spread yoke form, so as to conform in a measure with the outline of the end 30 of the feed-bar, and is provided at its extreme forward end with the

split-sleeve 54, affording a clamp for the confinement of the pin 55, extending from the face of the sliding-shoe 56, which embraces the rocking-arm 38 and freely slides thereon. The sleeve 54 also affords the medium for connection of the arm 57, the latter having a flattened lug or extension 58 extending between the ears of the sleeve 54, and through which passes the screw 59 for the purpose of securely clamping the arm 57 to the forward end of the lever 51. By manipulating the arm 57, it will be understood that the shoe 56 can be moved longitudinally on the arm 38, thus rocking the latter on its axis 41 in the bearing 39 and causing the same to reciprocate the auxiliary feed-dog 33 in the guide-head 31 by means of the pin and slot connection 35—37. In order to provide a ready means for manipulating the lever 51, a chain or rod 60 is linked, or otherwise connected, to the arm 57 and, now viewing Fig. 6, at its lower end is connected with the outer end of the arm 61 connected to the knee-shift 62, the latter being pivoted at 63 to the depending portion of a bracket 64 secured in any suitable manner to the bottom of the table 65, on which the bed-plate of the machine rests. For simplicity of illustration in this case, the element 60 is shown as a rod although a chain is preferably used including the auxiliary devices for taking up slack and preventing rattling thereof, in all material respects the same as in my above mentioned Patent Number 922,646. This particular construction, not being of the essence of my present invention, has not been specifically portrayed. The knee-shift 62 and arm 61 constitute a bell-crank lever the fulcrum of which is at 63, and said arm 61 may be made integral with the knee-shift 62 or detachably connected thereto by means of the screws 65^a passing through the angular end of the arm 61 and into the extension 66 of the knee-shift. Viewing Fig. 2, it will be seen that the curvature of the arm 38 is the arc of a circle struck from the axis 24 of the lever 51 and, hence, as the shoe 56 is moved longitudinally of said arm 38, the auxiliary feed-dog will be moved relatively to the main feed-dog, according to the extent of the movement of the said shoe on said arm and the disposition of the pivot thereof. By means of the knee-shift such movement can be accomplished during the operation of the machine and at the will of the operator, and by the proper disposition of the stops 44 and 45 extremes of adjustment may be instantly obtained and any degree of adjustment between the two stops can also be obtained during the operation of the machine by proportionately sliding the shoe 56 upon the arm 38, as will be understood. Obviously, the slot 37 in the arm 38 permits the vertical rise and fall of the entire feed-bar and

the longitudinal slot 36 in the guide-head 31 permits the independent movement of the auxiliary dog 33 in said head and relatively to the feed-bar and the main feed-dog. It will be noted that, by adjusting the bar 45 so that the stop-lug 50 may be practically against the bottom of the cloth-plate, thus allowing the shoe 56 to have a position such that its pin 55 may be approximately at the upper end of the arm 38, the auxiliary dog 33 will be drawn close to the primary dog 28, thus making in effect a single solid feed-dog. In this position of the parts, the auxiliary dog will have the same movement as the primary dog and the feed will operate as an ordinary feed.

With the above detailed description, the operation of the feeding mechanism will be obvious, and it only remains to refer to the general disposition and operation of the several mechanisms.

The character of feed movement desired will be produced by the adjustment of the bars 44 and 45 between which the sleeve 54 operates and with which it coöperates for controlling the extent of movement of the slide-shoe 56 upon the arm 38. Obviously, during the operation of the machine, the auxiliary dog 33 may be quickly shifted so as to have two extremes of movement as compared with the movement of the primary dog, and any variation between these two extremes may also be secured or produced by the movement of the knee of the operator upon the knee-shift 62. As before stated, the trimming mechanism is located close to the auxiliary feed and in advance of the stitching point, thus enabling the machine to feed the work up to the needle and trim the edge of the work preparatory to having its edges overstitched or bound. The particular form given to the portion 30 of the feed-bar and the corresponding part of the adjusting lever 51, viz., the yoke or U-form, is for the purpose of enabling the feed to operate on opposite sides of the stitching point and thus feed the work to and from the stitch-forming mechanism in the direct line of the stitch or path of movement of the needle, as well as beside the line of stitching. By curving the feed-bar and the forward end of the lever 51 as shown and described, a compact arrangement of the stitch-forming mechanism can be made, whereby the looper can be brought close to the cloth-plate and in proper coöperation with the needle without interfering with the feed-dogs or the operation of the feed-bar, and the mechanism for regulating the throw of the auxiliary dog is also rendered capable of being operated from the front of the machine rather than the rear thereof, the latter being exceedingly inconvenient and especially as to the means for adjusting the throw of said lever. The stops for regulat-

ing the throw of the lever are thus placed in position such that the operator, without leaving his seat, can easily and quickly make the necessary adjustments. Moreover, by forming the feed-bar as described and shown, the trimming mechanism can be approached and set close to the feed and to the line of stitching without in any manner interfering with either the stitch-forming mechanism or the feeding mechanism. These are all essential and important features as regards the compact arrangement and coöperative relation of the mechanisms, their convenient manipulation as described, and the ultimate functions of the machine, viz., the proper trimming, overedging and feeding of the work, and the production of variations in feed during the operation of the machine. It will be noted that the needle reciprocates in a path close beside the feed-dogs and substantially midway between the forward end of the main dog and rear end of the auxiliary dog; and that, as shown in Fig. 7, a guard-plate 67 is secured to the forward end of the presser-foot and beside which the upper trimmer-blade 10 operates, said guard serving to prevent the fingers of the operator from getting under the edge of said blade.

Obviously, many changes may be made in the construction of the various parts of the feed mechanism without altering the principle or changing the coöperative relation, or modifying the operation of the various parts of the several mechanisms, the important features of the invention having been hereinabove set forth. Hence, among the advantages of this invention, the following may be noted: A sewing machine is provided by means of which the work can be stitched and fed, and by the manipulation of the feeding mechanism a variety of effects can be produced upon the work while being stitched; the feeding mechanism can be adjusted, during the operation of the machine and at the will of the operator, for the purpose of shirring, puckering or fulling the work at its edge or in its body according to desire, or said work can be fed uniformly in all parts in its progress to the stitching mechanism; variations in the feed of the work can be obtained, during the operation of the machine and according to the desire of the operator, by merely manipulating the lever 51 by the knee-shift or by hand applied to the forward end of the arm 57 or the forward end of the arm 61; trimming and overedging can be accomplished simultaneously, the one in advance of the other, in a machine in which the possibilities of varying the condition of the edge of the work are great, thus enabling the operator to produce various effects on the overstitched edge of the work; a feeding mechanism has been produced by means of which any of the ordinary trim-

ming and overedging machines can be increased in capacity, viz., the feeding mechanism is of such construction as to render it capable of being applied to many of the well-known types of overedging machines, owing to the fact that the feed-bar does not interfere with either the trimming or the lower stitch-forming elements, hence, enabling the ordinary overedging machine to have applied thereto a differential feed; and a differential feeding mechanism is produced which is capable of conversion into an ordinary feed and vice versa, as has been described.

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

1. In combination, a stitch-forming mechanism, and a feeding mechanism, the latter including a bar the forward end of which is provided with an opening and two spaced parts, a feed-dog fixed to one of said parts, a feed-dog movable on the other of said parts and arranged in advance of the fixed feed dog, and the looper of the stitch-forming mechanism being supported so as to operate within the opening of the feed-bar and below the said two feed-dogs, and means for differentially actuating said feed-dogs.

2. In combination, overedge stitch-forming mechanism, a trimming mechanism, a differential feeding mechanism, and means for regulating the action of the feeding mechanism during the operation of the machine whereby to control the character of the work, said means including a lever pivotally supported on a portion of said feeding mechanism and extending toward the front of the machine so as to be accessibly presented to the operator.

3. A differential feeding mechanism comprising a single feed-bar carrying two independent feed-dogs, means for actuating the bar to impart the essential movements, and means for actuating one of the dogs independently of the other, including a device carried by said bar and under control of the operator whereby, during the operation of the machine, movements of varying degree may be imparted to said dog.

4. A differential feeding mechanism including a feed-bar carrying two independent dogs, means for actuating said bar to impart its essential movements, and means carried by said bar for actuating one of the dogs independently of the other including a device whereby, during the operation of the machine, two extremes of adjustment of said dog may be obtained.

5. In combination, a stitch-forming mechanism including a needle and a looper, a feeding mechanism consisting of a single bar carrying two independent dogs, one arranged in advance of and the other behind the needle, and means including a device

carried by and movable relatively to said bar whereby the dog in advance of the needle may be given, during the operation of the machine, varying degrees of movement in order to control the condition of the work in front of the stitching point.

6. A feeding mechanism for sewing machines comprising a bar having at its end two separated supports, a feed-dog rigidly set upon one of said supports of the bar, an auxiliary dog movably secured to the other of said supports of the bar, and means for actuating the auxiliary dog independently of the other dog including a lever pivoted to the bar and connected with the auxiliary dog.

7. A feeding mechanism for sewing machines comprising a feed-bar carrying a main dog, an auxiliary dog also carried by said bar and movable independently of the main dog, and means for imparting to the auxiliary dog its independent movements, including a lever controlled as to its normal position by a spring, and means by which, during the operation of the machine, manipulation of the lever will control the action of the auxiliary dog.

8. A feeding mechanism for sewing machines comprising a feed-bar carrying a main dog and an auxiliary dog, one of the said dogs being movable independently of the other, and means for controlling the action of said auxiliary dog including a lever carried by said bar, a lever supported on the frame of the machine, and means for slidably connecting the two said levers.

9. A feeding mechanism comprising a feed-bar carrying a main dog and an auxiliary dog, means for actuating the bar, and means for actuating the auxiliary dog independently of the bar, said means including a lever extending lengthwise of said bar, a lever extending at an angle to said bar, a sliding connection between said levers, and means for connecting one of said levers to the auxiliary dog.

10. A feeding mechanism for sewing machines comprising a feed-bar carrying two independently mounted dogs, means for actuating said bar, means for actuating one of the dogs independently of the other, said means including a spring-controlled lever, a lever slidably coupled to said independent dog and the said first named lever, and means for actuating said first named lever relatively to said second lever, whereby to control the action of said independent dog.

11. A feeding mechanism for sewing machines comprising a feed-bar carrying a main and an auxiliary dog, means for actu-

ating said bar for imparting the essential movements, and means for actuating the auxiliary dog independently of the main dog including a lever mechanism and a plurality of stops cooperating with said mechanism whereby to limit the action thereof, and means for adjusting said stops.

12. A feeding mechanism comprising a feed-bar carrying a main and an auxiliary dog, means for actuating the bar for imparting the essential movements, and means for actuating the auxiliary dog independently of the main dog, said means including a lever mechanism and a regulating mechanism, the latter including two independently adjustable stops between which a portion of the lever mechanism operates, and means for adjusting the stops to regulate the amount of movement to be imparted to the lever mechanism.

13. A feeding mechanism comprising a feed-bar carrying a main and an auxiliary dog, means for actuating the said bar for imparting the essential movements, means for actuating the auxiliary dog independently of the main dog including a lever mechanism, and means for regulating the movement of the lever mechanism including two bars arranged in parallelism and each having a stop-lug for contact with a portion of said lever mechanism, and means for regulating the position of said bars.

14. A feeding mechanism for sewing machines comprising a feed-bar carrying a main and an auxiliary dog, means for actuating the bar for imparting the essential movements thereto, means for actuating the auxiliary dog independently of the main dog including a lever mechanism, and means for controlling the action of said lever mechanism including a knee-rest and a connection between the latter and the lever mechanism.

15. A feeding mechanism for sewing machines comprising a feed-bar carrying a main and an auxiliary dog, means for actuating the bar for imparting the essential movements thereto, means for actuating the auxiliary dog independently of the main dog, and means for controlling the said actuating means during the operation of the feeding mechanism including a manually operable device.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN P. WEIS.

Witnesses:

C. MARSH,
M. VENEKAMP.