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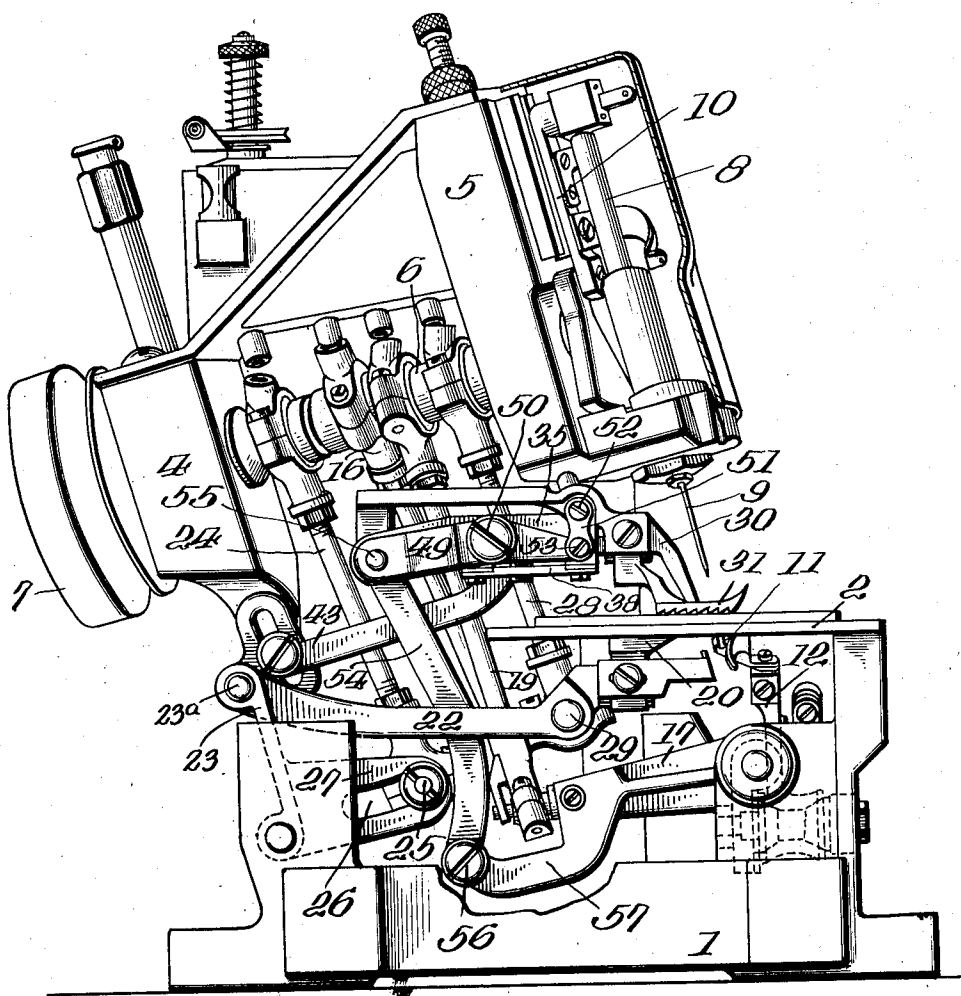
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FEEDING MECHANISM FOR SEWING MACHINES

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3 Sheets-Sheet 1

*FIG. 1.*



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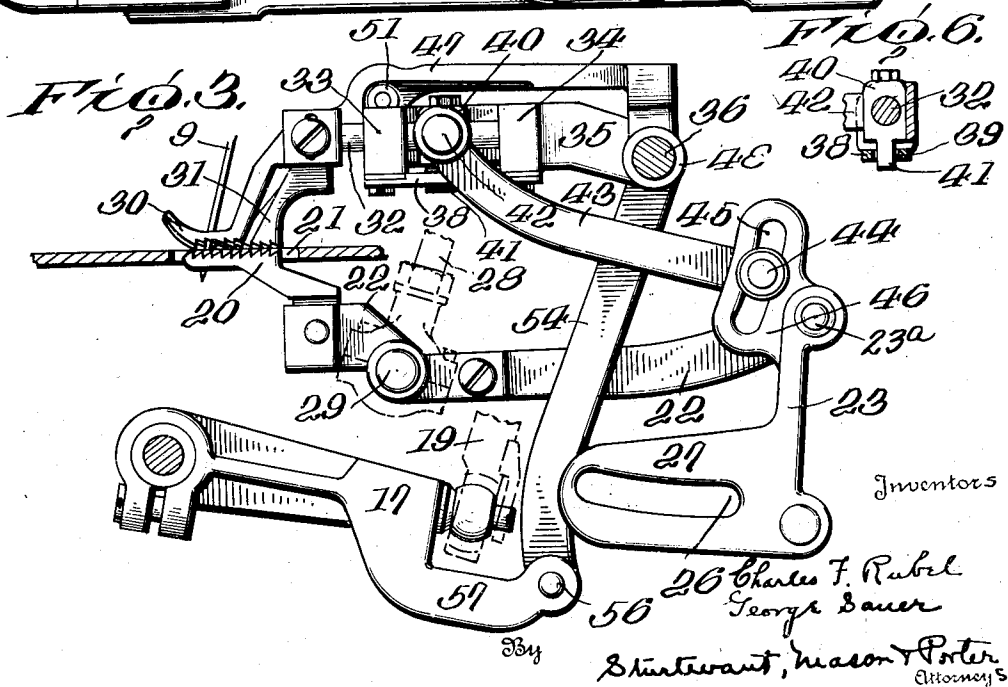
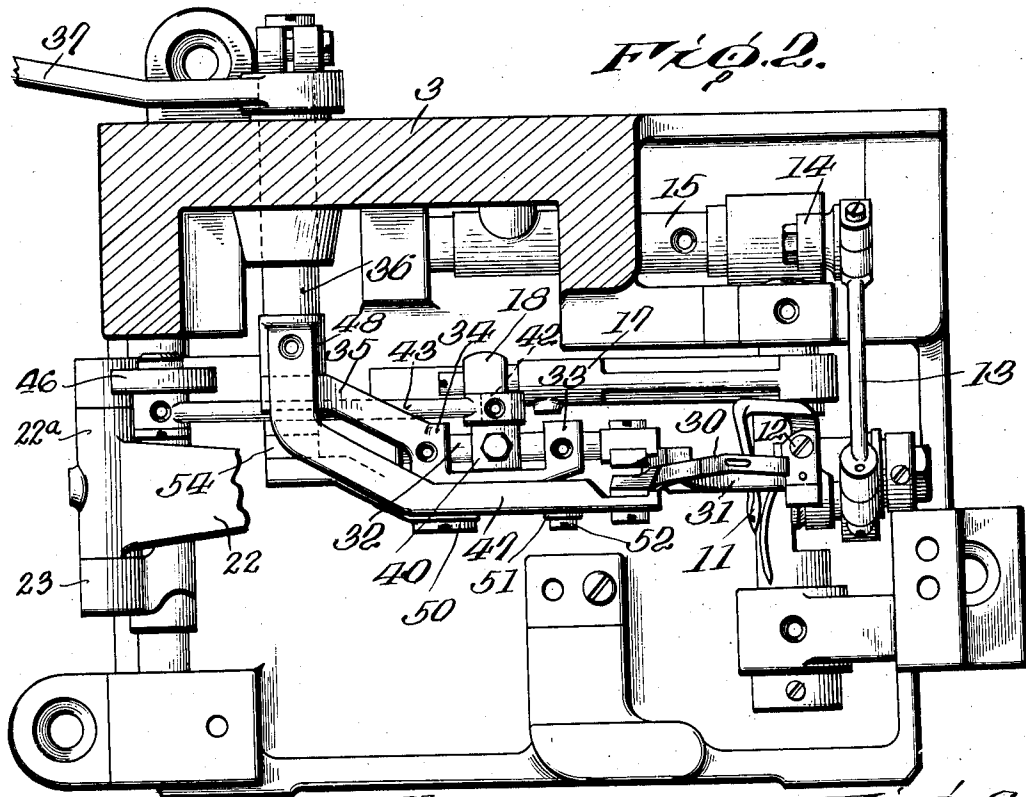
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3 Sheets-Sheet 2





## UNITED STATES PATENT OFFICE

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FEEDING MECHANISM FOR SEWING  
MACHINES

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12 Claims. (Cl. 112—207)

The invention relates to new and useful im-  
provements in a feeding mechanism for sewing  
machines, and more particularly to a feeding  
mechanism which clamps the work between feed  
dogs for imparting the movements thereto.

An object of the invention is to provide a feed-  
ing mechanism of the above type including an  
upper and a lower feed dog, wherein the upper  
feed dog is mounted on a bar movable endwise in  
substantially a horizontal direction, and wherein  
said feed dog is raised and lowered by an operat-  
ing member located beneath the work support.

A further object of the invention is to provide  
a feeding mechanism of the above type wherein  
the upper feed dog is raised and lowered by the  
same mechanism which imparts a needle avoid-  
ing movement to the looper.

A still further object of the invention is to  
provide a feeding mechanism of the above type  
with which is associated a presser foot carried  
by a presser bar extending in substantially a  
horizontal direction, and wherein said presser  
foot is raised from the fabric during the feeding  
thereof.

A still further object of the invention is to pro-  
vide a feeding mechanism of the above type  
wherein the presser foot is raised and lowered by  
the same operating element which lowers and  
raises the upper feed dog.

These and other objects will in part be obvious  
and will in part be hereinafter more fully dis-  
closed.

In the drawings which show by way of illus-  
tration one embodiment of the invention—

Figure 1 is a view taken from the end of the  
work support and showing the feeding mecha-  
nism in side elevation, parts of the machine be-  
ing in section and removed so as to show the  
operating mechanism of the machine;

Fig. 2 is a horizontal sectional view through  
the standard substantially in the plane of the  
work support, the work support and the lower  
feed being omitted in order to show more clearly  
the operating means for the upper feed and  
presser foot;

Fig. 3 is a view showing more or less diagram-  
matically the upper and the lower feeding mecha-  
nisms, with the improved devices for imparting  
movements thereto, the feed dogs being at the  
front end of their feeding stroke;

Fig. 4 is a view similar to Fig. 3, but showing  
the feed dogs as having moved substantially to  
the rear end of their feeding stroke;

Fig. 5 is a view similar to Fig. 3, but showing the  
feed dogs separated, the presser foot lowered, and

the feed dogs about to return for their next feed-  
ing stroke, and

Fig. 6 is a sectional view on the line 6—6 of  
Fig. 5.

In the present illustrated embodiment of the  
invention, a feeding mechanism is shown as ap-  
plied to a sewing machine which includes a sup-  
porting bed 1 carrying a work support 2. Extend-  
ing upwardly from the bed 1 is a standard 3 car-  
rying spaced brackets 4 and 5 in which the main  
actuating shaft 6 is mounted for rotation. This  
main actuating shaft 6 extends in the general  
direction of the line of feed and is disposed in a  
vertical plane cutting the line of feed at an acute  
angle. Said shaft is rotated by a belt wheel 7. The  
needle bar 8 carrying a needle 9 is recipro-  
cated by means of a link 10 which is connected to  
a crank on the forward end of the main actuating  
shaft 6.

Cooperating with the needle 9 beneath the work  
support is a looper 11 mounted on a looper car-  
rier 12. Said looper carrier 12 is oscillated for  
moving the looper into and out of the needle loop  
by means of a link 13, which link is connected to  
a ball stud carried by an arm 14 mounted on a  
shaft 15. The shaft is oscillated by means of an  
eccentric strap 16, which cooperates with an  
eccentric on the main actuating shaft 6.

The looper is given a lateral or needle avoiding  
movement by an arm 17. The arm 17 carries a  
ball stud 18 to which an eccentric strap 19 is con-  
nected. This eccentric strap cooperates with an  
eccentric on the main actuating shaft 6.

The machine thus described is of the type  
shown, described and claimed in the patent  
granted Norman V. Christensen and Frederick  
F. Zeier, March 25, 1930, No. 1,751,508.

The feeding mechanism includes a lower feed  
dog 20 operating through a slot 21 in the cloth  
plate. This feed dog 20 is rigidly secured to a feed  
bar 22. The feed bar in turn is pivoted to a feed  
rocker 23 which is oscillated by means of an  
eccentric strap 24 connected to a ball stud 25 ad-  
justable in a slot 26 in an arm 27 formed integral  
with the feed rocker. The rocker is provided with  
spaced bearings at the upper end thereof, and the  
sleeve 22a at the rear end of the feed bar is  
journaled on a pin 23a carried by these spaced  
bearings. The eccentric strap 24 cooperates with  
an eccentric on the main shaft 6. The feed bar  
is raised and lowered for moving the feed dog into  
and out of engagement with the fabric by an ec-  
centric strap 28 which is pivoted at 29 to the feed  
bar 22 and which cooperates with the eccentric  
strap on the main actuating shaft.

Cooperating with the lower feeding mechanism is an upper feeding mechanism including a feed dog 31. The two feed dogs 20 and 31 operate to clamp the material therebetween, and impart the feeding movements thereto, after which the feed dogs are separated and returned for their next feeding stroke. Associated with the feed dogs is a presser foot 30 which clamps the material against the work support during the return of the feed dogs and during the stitch formation.

The feed dog 31 is carried by a feed bar 32 which is mounted for reciprocation in bearings 33 and 34 carried in a bracket arm 35 which is fixed to a shaft 36, and the shaft 36 in turn extends through the standard 3 and is mounted for oscillation in suitable bearings formed therein. Attached to the outer end of the shaft 36 is a lever arm 37. Connecting the brackets 33 and 34 are two plates 38 which are spaced to form a slot 39 and adjustable to take up wear. Mounted on the feed bar 32 is a collar 40. This collar 40 has a depending lug 41 which extends into the slot 39. The purpose of this lug is to prevent the feed bar from oscillating while permitting the same to move endwise, the lug moving back and forth in the slot. Also mounted on this collar 40 is a pin 42 to which a link 43 is pivotally connected. The link at its other end is connected to a stud 44 which is adjustably mounted in a slot 45 carried by a bracket 46 formed as a part of the feed rocker 23. Thus it is that the feed bar 32 is moved back and forth for imparting feeding movements to the feed dog 31. The slot 45 is so dimensioned and positioned that the stud 44 may be positioned therein so as to vary the timing of the feed dogs relative to each other. This provides a means whereby the upper feed dog can be caused to operate either slower or faster or in unison with the lower feed dog, as desired.

The presser foot 30 is carried by a presser bar 47. This presser bar is attached to a collar 48 which is mounted for free oscillation on a bushing sleeve carried by the shaft 36. A lever 49 is pivoted at 50 to the bracket arm 35. This lever is connected by means of a link 51 to the presser bar 47. Said link is pivoted at 52 to the presser bar and at 53 to the lever. The lever at its other end is connected to an operating link 54 which is pivoted at 55 to the lever. This operating link 54 is in turn pivoted at 56 to an arm 57 formed as an extension of the arm 17 which imparts a needle avoiding movement to the looper.

In Fig. 3 of the drawings, the needle is shown on its up-stroke. The interlocking of the thread loops has been completed, and while the needle is above the work, the fabric sections are fed for positioning the same for the next stitch formation. The feed dogs are about to engage the fabric sections, and the presser foot about to leave the fabric sections, so that the feeding of the fabric sections may be accomplished.

In Fig. 4 of the drawings, the presser foot is shown as raised, and the feed dogs are imparting the feeding movement to the fabric sections. The presser foot is raised by the downward movement of the arm 17. When said arm moves downward, the link 54 pulling downward on the lever 49 will cause the presser bar to be lifted, raising the presser foot from the fabric sections. At this time, the upper feed dog contacting with the upper fabric section will hold the bracket arm 35 from downward movement, so that the pivotal connection 50 between the lever 49 and this bracket arm 35 will serve as a fulcrum, and it is the swinging of the lever 49 on this fulcrum that

raises the presser foot. The feed dogs are both moved while clamping the fabric sections through the turning of the feed rocker 23 in a clockwise direction, as viewed in Fig. 3.

In Fig. 5 of the drawings, the feed dogs are shown as having completed their feeding movement and as having separated so as to return for their next feeding stroke. The presser foot is at this time contacting with the fabric sections on the work support, and will serve to limit any downward movement of the bracket arm 35, for the reason that the bracket arm is connected to the presser bar through the link 51. The arm 17 is now raised instead of lowered, and through the link 54, the lever 49 is turned about the pivotal point 53 where said lever is connected to the link 51. This turning of the lever 49 about the pivotal center 53 and in a clockwise direction as viewed in Fig. 1, will lift the bracket arm 35, and will thus lift the upper feed dog. The feed bar carrying the lower feed dog is at this time lowered through the operation of the eccentric with which the eccentric strap 28 cooperates.

From the above it will be apparent that a feeding mechanism has been provided which is very simple in construction, and wherein the feed dog and presser foot are carried by members extending substantially in a horizontal direction. When the feed dog is lifted, the presser foot is forced against the material, and when the presser foot is lifted, the feed dog is forced against the material, so that there is a constant engagement of one or the other with the material at all times. These movements of the upper feed dog and the presser foot are all accomplished through a single operating link 54, which, in the present embodiment of the invention, is connected to a member forming a part of the mechanism which gives a needle avoiding movement to the looper. The feed dogs are given their fabric engaging movements through a positively connected train of devices. When it is desired to remove the fabric from the machine, the arm 37 is depressed and this will oscillate the shaft 36, swinging the supporting bracket 35 which is fixed thereto, and this will raise, not only the feed bar carrying the upper feed dog, but also the presser bar carrying the presser foot. It is noted that the bracket arm 35 turns with the shaft 36. The connections of the link 43 to the feed bar and to the feed rocker are so disposed that this bracket arm 35 can be swung for raising the feed bar and the feed dog solely through the turning of the shaft 36. In effect, the entire upper feeding mechanism, including the feed bar, the feed dog and the supports for the feed bar, and the connections to the feed bar for imparting movements thereto, are all so disposed that the upper feeding mechanism moves substantially as a unit when it is desired to raise the feed dog from the fabric for the removal or insertion of material. When the presser foot is raised during the operation of the machine, it swings about the center of the shaft 36 as an axis. Likewise, when the feed dog is raised during the operation of the machine, it swings about the center of this shaft as an axis. When the thickness of the fabric operated upon increases or decreases there will be a shifting of the working position of the presser foot and the feed dog, but this shifting is also about the axis of the shaft 36 as a center, and therefore, for all thicknesses of fabric, there will be the same extent of lift of the feed dog or the presser foot above the surface of the material.

While the feed dog and presser foot are shown as operated from the member forming a part of the mechanism giving to the looper a needle avoiding movement, it will be understood that any suitable operating part beneath the work support, properly timed, may be used for this purpose. While the feeding mechanism is shown as applied to a type of machine which is especially adapted for stitching at the edge of a fabric section through the particular arrangement of the main actuating shaft, it will be understood that it may be used in other types of sewing machines without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what we claim as new and desire to secure by Letters-Patent, is—

1. A feeding mechanism for sewing machines including in combination a work support, a feed dog located above the work support, a feed bar supporting said feed dog and extending in substantially a horizontal direction, a bracket member in which said feed bar is mounted for endwise movement, means for moving the feed bar endwise in said bracket member, a presser foot, a presser bar supporting the same and extending in substantially a horizontal direction, and means for alternately raising and lowering said bracket arm and said presser bar.

2. A feeding mechanism for sewing machines including in combination a work support, a feed dog located above the work support, a feed bar supporting said feed dog and extending in substantially a horizontal direction, a bracket member in which said feed bar is mounted for endwise movement, means for moving the feed bar endwise in said bracket member, a presser foot, a presser bar supporting the same and extending in substantially a horizontal direction, a lever pivoted intermediate its ends to said bracket member, a link connecting one end of said lever to said presser bar, and means connected to the other end of said lever and operating through said lever for alternately raising and lowering said bracket member and said presser bar.

3. A feeding mechanism for sewing machines including in combination, a work support, a feed dog located above the work support, a feed bar carrying said feed dog and extending in substantially a horizontal direction, a pivoted bracket arm in which said feed bar is mounted for endwise movement, means connected to said feed bar for reciprocating the same in the bracket arm, a presser foot, a presser bar carrying said presser foot and extending substantially in a horizontal direction, means for pivotally supporting said presser bar, a lever pivotally mounted on said bracket arm, a link connecting one end of said lever to the presser bar, and means connected to the other end of said lever and operating therethrough for alternately raising and lowering said bracket member and said presser bar.

4. A feeding mechanism for sewing machines including in combination, a work support, a feed dog located above the work support, a feed bar carrying said feed dog and extending substantially in a horizontal direction, a bracket arm having spaced bearing members in which said feed bar is mounted for reciprocation, a collar attached to the feed bar between said bearing members, said collar being provided with a lug having a sliding engagement with the bracket arm for preventing the feed bar from turning in

its bearings, a link connected to said collar for reciprocating said feed bar, a feed rocker to which said link is connected, a presser foot, a presser bar carrying said presser foot and extending in substantially a horizontal direction, a lever pivotally mounted on said bracket arm, a link connecting one end of said lever to said presser bar, and means connected to the other end of said lever and operating therethrough for alternately raising and lowering said bracket arm and said presser bar.

5. A feeding mechanism for sewing machines including in combination a work support, a feed dog located above the work support, a feed bar carrying said feed dog and extending substantially in a horizontal direction, a bracket arm having spaced bearing members in which said feed bar is mounted for reciprocation, a collar attached to the feed bar between said bearing members, said collar being provided with a lug having a sliding engagement with the bracket arm for preventing the feed bar from turning in its bearings, a link connected to said collar for reciprocating said feed bar, a feed rocker to which said link is connected, a presser foot, a presser bar carrying said presser foot and extending in substantially a horizontal direction, a lever pivotally mounted on said bracket arm, a link connecting one end of said lever to said presser bar, means connected to the other end of said lever and operating therethrough for alternately raising and lowering said bracket arm and said presser bar, a feed dog located beneath the work support, a feed bar carrying said feed dog, said feed bar being connected to said feed rocker, and means for raising and lowering said feed bar.

6. In a sewing machine, the combination of a work support, a needle, a looper cooperating with said needle and disposed beneath the work support, means for moving the looper into and out of the needle loop, means for giving said looper a needle avoiding movement, a feed dog located above the work support, a feed bar carrying said feed dog and extending substantially in a horizontal direction, a bracket arm, bearings carried by the bracket arm in which said feed bar is mounted for reciprocation, means connected to the feed bar between said bearings for reciprocating the same, a presser foot above the work support, a presser bar carrying said presser foot and extending substantially in a horizontal direction, a lever pivotally supported on said bracket arm, a link connecting one end of said lever to said presser bar, and a link connecting the other end of said lever to the means for imparting a needle avoiding movement to the looper and operating through said lever to alternately raise and lower the bracket arm and the presser bar.

7. In a sewing machine, the combination of a work support, a needle, a looper cooperating with said needle and disposed beneath the work support, means for moving the looper into and out of the needle loop, means for giving said looper a needle avoiding movement, a feed dog located above the work support, a feed bar carrying said feed dog and extending substantially in a horizontal direction, a bracket arm, bearings carried by the bracket arm in which said feed bar is mounted for reciprocation, means connected to the feed bar between said bearings for reciprocating the same, a presser foot above the work support, a presser bar carrying said presser foot and extending substantially in a horizontal direction, a lever pivotally supported on said bracket arm, a

a link connecting one end of said lever to said presser bar, a link connecting the other end of said lever to the means for imparting a needle avoiding movement to the looper and operating through said lever to alternately raise and lower the bracket arm and the presser bar, a feed dog located beneath the work support, a feed bar supporting the same, a feed rocker to which said feed bar is connected, and means for oscillating the feed rocker, said means for operating the feed bar carrying the feed dog located above the work support being connected to said feed rocker.

8. A sewing machine including in combination a supporting base, a standard carried thereby, a main actuating shaft mounted on said standard, and extending in the general direction of the feed, and in a vertical plane cutting the line of feed at an acute angle, a work support, a feed dog located above the work support, a feed bar carrying said feed dog and extending substantially in a horizontal direction, a bracket arm pivotally mounted on said standard, bearings carried by the bracket arm in which said feed bar is mounted for reciprocation, a feed rocker located beneath the work support, said feed rocker having a slotted arm, an eccentric member on the actuating shaft, an eccentric strap cooperating therewith and connected to said slotted arm, a second slotted arm carried by the feed rocker, a link connecting said arm to the feed bar for reciprocating the same, a presser foot, a presser bar carrying said presser foot and extending substantially in a horizontal direction and pivotally mounted on said standard, a lever pivoted to said bracket arm, a link connecting the lever to the presser bar, an oscillating member located beneath the work support, a link connecting said oscillating member to said lever, an eccentric on the main actuating shaft, and an eccentric strap cooperating therewith and connected directly to said oscillating member for oscillating the same.

9. A sewing machine including in combination a supporting base, a standard carried thereby, a main actuating shaft mounted on said standard, and extending in the general direction of the feed, and in a vertical plane cutting the line of feed at an acute angle, a work support, a feed dog located above the work support, a feed bar carrying said feed dog and extending substantially in a horizontal direction, a bracket arm pivotally mounted on said standard, bearings carried by the bracket arm in which said feed bar is mounted for reciprocation, a feed rocker located beneath the work support, said feed rocker having a slotted arm, an eccentric member on the actuating shaft, an eccentric strap cooperating therewith and connected to said slotted arm, a second slotted arm carried by the feed rocker, a link connecting said arm to the feed bar for reciprocating the same, a presser foot, a presser bar carrying said presser foot and extending sub-

stantially in a horizontal direction and pivotally mounted on said standard, a lever pivoted to said bracket arm, a link connecting the lever to the presser bar, an oscillating member located beneath the work support, a link connecting said oscillating member to said lever, an eccentric on the main actuating shaft, an eccentric strap cooperating therewith and connected directly to said oscillating member for oscillating the same, a feed dog located beneath the work support, a feed bar carrying the same, said feed bar being directly connected to said feed rocker, an eccentric strap on said actuating shaft, and an eccentric member cooperating therewith and directly connected to said last-named feed bar for raising and lowering the same.

10. A feeding mechanism for sewing machines including in combination a work support, a feed dog located above the work support, a feed bar supporting said feed dog and extending in substantially a horizontal direction, a bracket member in which the feed bar is mounted for endwise movement, means for moving the feed bar endwise in said bracket member, means for pivotally supporting said bracket member, means whereby said bracket member is raised and lowered for giving to said feed dog fabric engaging movements for the feed of the material, and means whereby said bracket member may be shifted for raising the feed bar and feed dog bodily to permit the removal or insertion of the material.

11. A feeding mechanism for sewing machines including in combination a work support, a feed dog located above the work support, means for supporting said feed dog whereby said feed dog may be moved back and forth and raised and lowered, a presser foot, a presser bar supporting said presser foot, said feed dog supporting means and said presser bar being mounted for oscillating movements about fixed axes, and means for oscillating said feed dog supporting means and said presser bar so as to alternately bring the feed dog and the presser foot into contact with the material on the work support.

12. A feeding mechanism for sewing machines including in combination a work support, a feed dog located above the work support, means for supporting said feed dog whereby said feed dog may be moved back and forth and raised and lowered, a presser foot, a presser bar supporting said presser foot, said feed dog supporting means and said presser bar being mounted for oscillating movements about a common axis, and interconnecting means for oscillating said feed dog supporting means and said presser bar so as to alternately bring the feed dog and the presser foot into contact with the material on the work support.

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