

**Aug. 6, 1935.**

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**2,010,574**

## STITCHING MECHANISM

Filed Oct. 20, 1930

4 Sheets-Sheet 1

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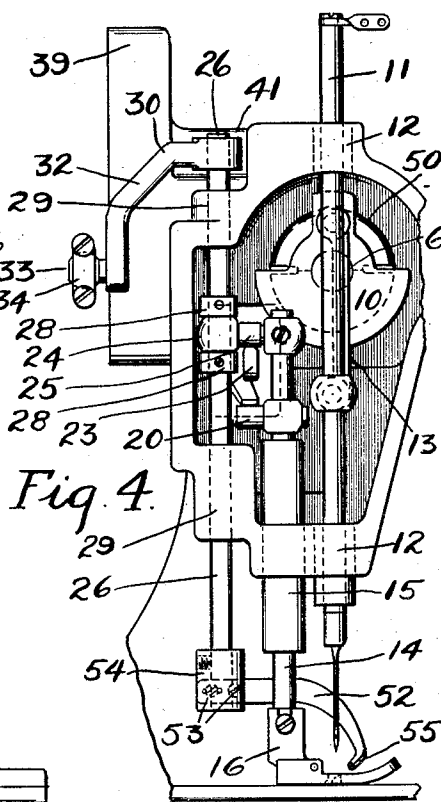
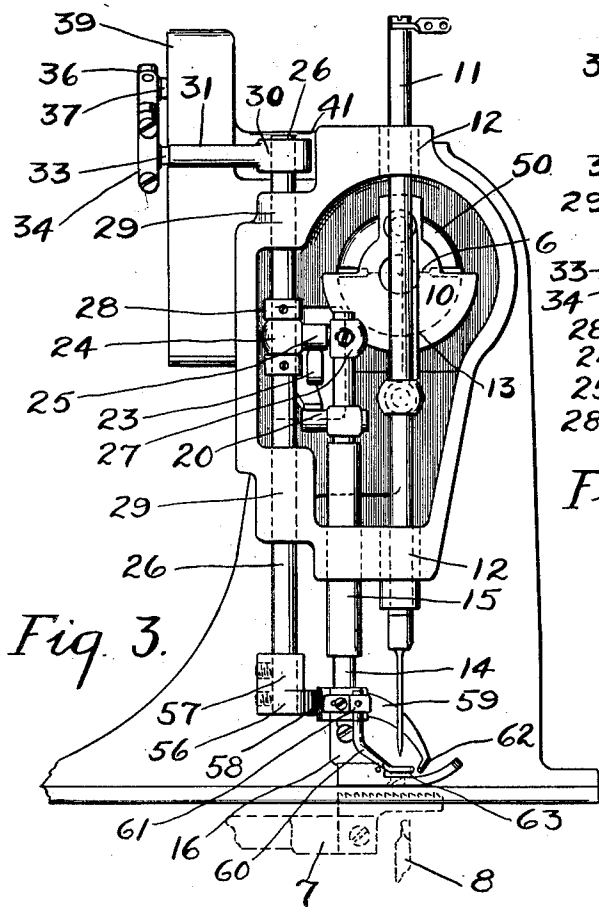
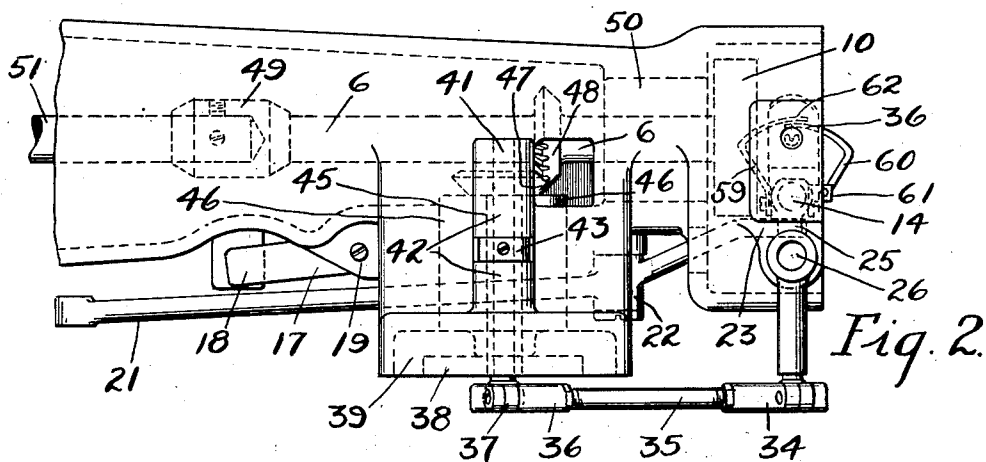
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STITCHING MECHANISM

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4 Sheets-Sheet 2



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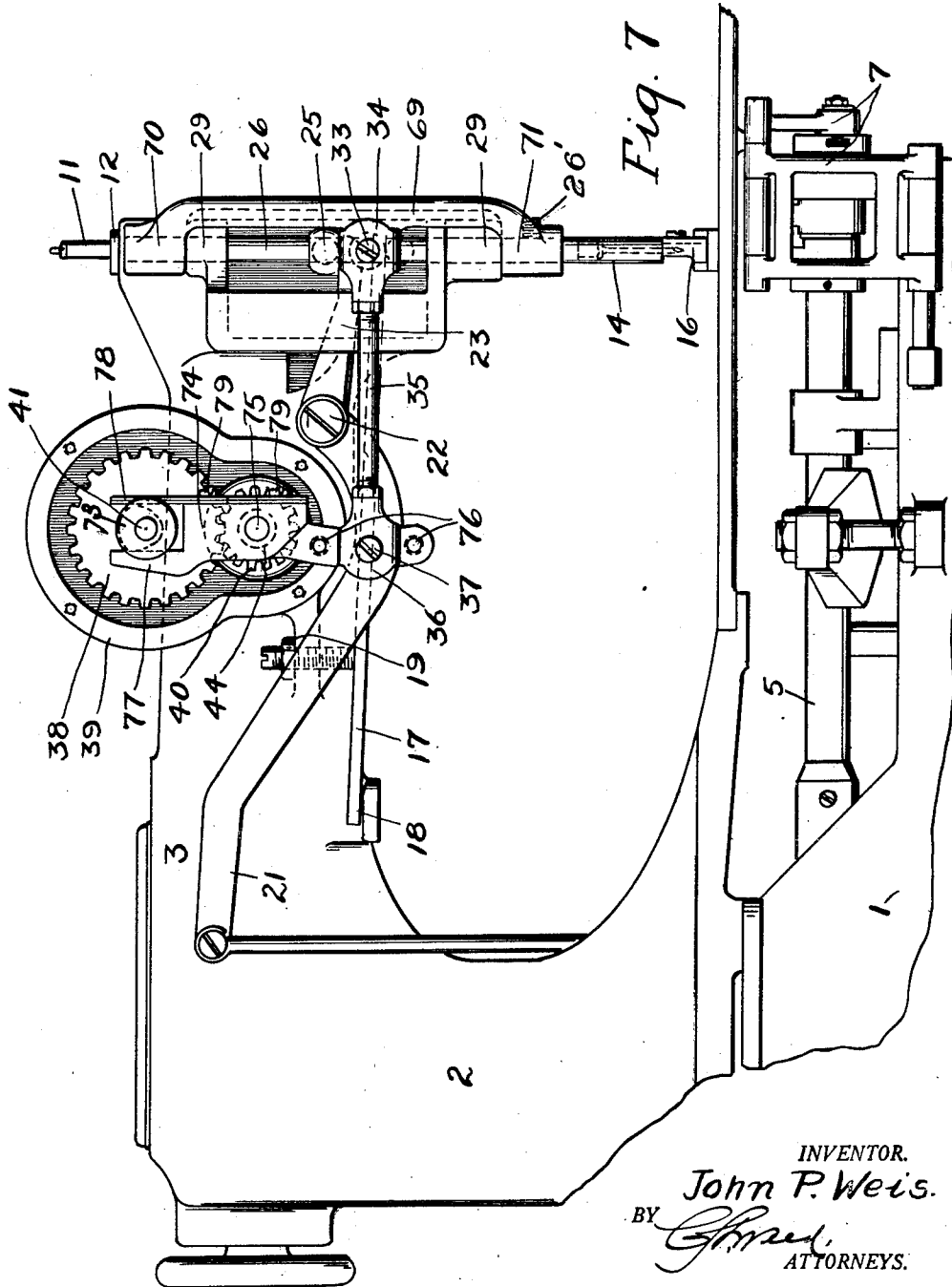
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STITCHING MECHANISM

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4 Sheets-Sheet 4

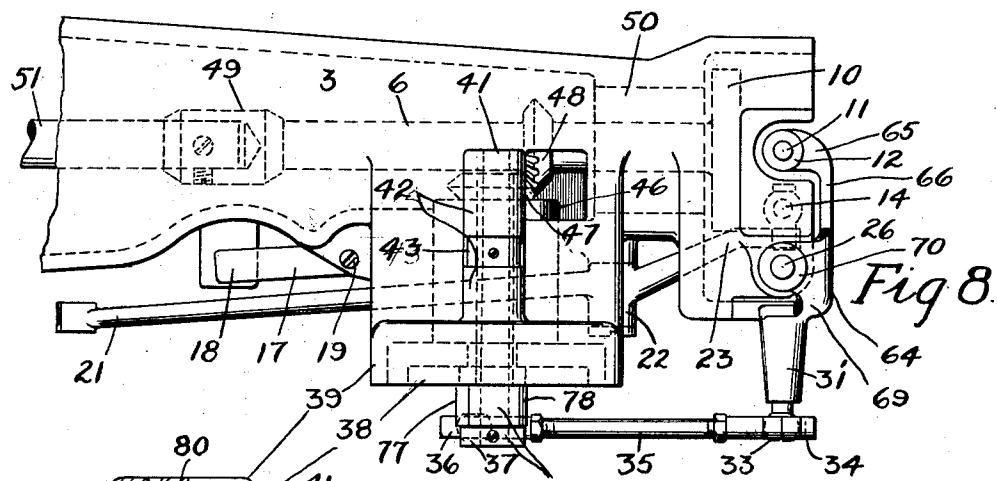


Fig. 8.

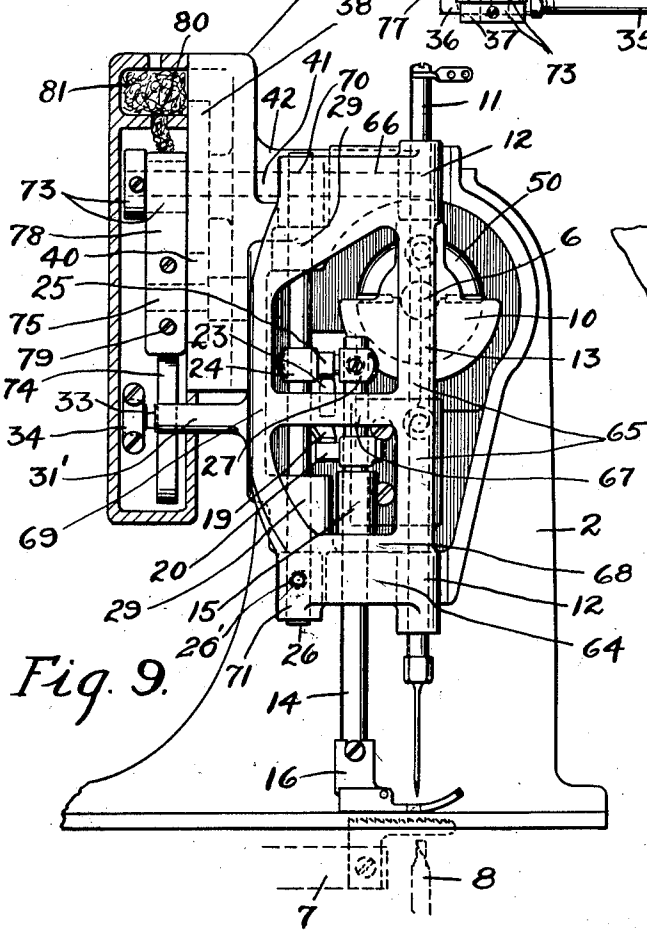


Fig. 9.

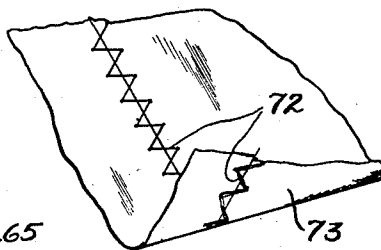


Fig. 10.

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## UNITED STATES PATENT OFFICE

2,010,574

## STITCHING MECHANISM

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Application October 20, 1930, Serial No. 489,830

33 Claims. (Cl. 112—100)

This invention relates to sewing machines and more particularly to improved stitching mechanism for making different kinds of cross, zig-zag, or ornamental covering stitches on the surface of the material being stitched, particularly the top surface thereof during the formation of the seam or hems, especially in that class of work where a covering, ornamental or decorative finish is desired in addition to the stitching of the parts necessary for the manufacture of the article.

The primary object of the invention is the provision of cross thread laying mechanism embodying one or a pair of cross thread carrying fingers operative to form various styles of stitches and operated by interchangeable gears whereby, by changing the ratio of the gears, different forms of stitches will be produced.

Manufacturers of garments are in constant need of a variety in trim, style and color, thus requiring stitches of different colors and having a variety of formations, and therefore a machine which can produce by a minimum change of its parts, different kinds of stitches, offers important advantages since it is readily adaptable to changes in style.

Therefore, the object of the present improvement is the provision of an improved machine which, by a simple change of its parts is readily adapted to the making of a variety of stitch formations, in other words, by using a standard sewing machine and by merely interchanging a few small parts, I am able to produce a number of different stitch formations, thus saving the expense of building different machines, each for a different stitch formation. The present improved machine will make a single thread cross stitch by laying loops of a thread on top of the work in the path of the needles at each needle movement or cycle of the machine, or will make a cross stitch by laying a thread on the top of the work in the path of the needles, first to the right and then to the left at every other cycle of the machine, or will make cross stitches with two threads by laying them in cross formation on the work under the needle stitches at every other cycle of the machine, or at every second cycle of the machine, or will make serpentine or snake stitches in bent or corrugated form under the needle stitches at each cycle or every second or every third cycle of the machine, or will make zig-zag stitches in the work useful for many sewing operations, all of which, as well as other variations of stitch formation may be obtained by a simple change of the parts whereby the ma-

chine is adapted to do the various kinds of work hereinbefore enumerated with very little expense to the users thereof.

One of the objects of the present improvement is the provision of stitching mechanism for producing the ornamental effects referred to, which will not interfere with the handling of the work or limit the work space under the arm or around the needles, and in the present improvement the stitching mechanism is operated by a rotary top shaft and, therefore, comprises less moving parts than any mechanism of its kind heretofore known.

In the drawings accompanying and forming a part of this specification, Figure 1 is a rear view of a long arm Metropolitan sewing machine having the present improvement applied thereto.

Figure 2 is a top view thereof.

Figure 3 is a right hand end view of Figure 2.

Figure 4 is a view similar to Figure 3 showing one cross stitch finger instead of two.

Figures 5 and 6 illustrate the different stitch formations which may be produced by this improved cross stitch mechanism.

Figures 7, 8 and 9 are views similar to Figures 1, 2 and 3, illustrating the machine adapted for making zig-zag stitches, and

Figure 10 illustrates such zig-zag stitches applied to a piece of material having a butted seam.

Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts which are illustrated in the accompanying drawings, since the invention is capable of other embodiments and that the phraseology which I employ is for the purpose of description and not of limitation.

The present invention is illustrated as applied to a well-known Metropolitan sewing machine, of which a brief description only is necessary.

The base 1 of the machine has the trunk 2 and the overhanging arm 3 carrying a head 4. In the base, the usual rotary shaft 5 operates and in the overhanging arm a rotary shaft 6 is located. The feed mechanism 7 of suitable form and the looper mechanism 8 are operated by the lower rotary shaft 5 while the needle bar 11 is operated by the rotary crank 10, see Figures 3 and 4, from the top rotary shaft 6.

The needle bar 11 reciprocates in bearings 12 and is connected with the rotary crank 10 by a pitman 13. Located in the head 4 is the presser foot mechanism, the presser bar 14 of which op-

erates in a bearing 15 and has a presser foot 16 attached at its lower end. A presser spring 17 supported at 18 by the overhanging arm 3 and provided with a tensioning means 19 to regulate the pressure of the spring on the collar 20 of the presser bar 14 keeps the presser foot 16 on to the work.

Suitable lifting means is provided for the presser foot comprising a lever 21 pivoted at 22 to the overhanging arm 3, the end 23 of which lever is in position to contact with a guide yoke 24 having a telescopic stem 25 located between the presser bar 14 and the vertical rock shaft 26, one part thereof being clamped at 27 to the presser bar 14. The rock shaft 26 has clamped to it collars 28 at the top and bottom of the yoke to limit the vertical adjustment thereof and these collars ride against the top and bottom faces of the yoke 24 in which the vertical shaft 26 rocks, this shaft 26 being also supported in bearings 29 of the head 4.

Clamped to the top end of this rock shaft 26 is a lever 30 having a straight arm 31 as in Figure 3 or a bent arm 32 as in Figure 4, and the opposite end of this lever is provided with a ball stud 33 connecting it to one end 34 of a connecting rod or connector 35, the other end of which is connected to a ball stud 37 carried by a gear 38 rotatably supported in a housing 39 where it is enclosed together with a driving gear 40, which gears, in the present instance, have a ratio of two to one, there being twice as many teeth in the large gear 38 as there are in the gear 40.

This housing is of suitable size to provide sufficient space for much larger gears, thereby permitting other gears to be substituted for the formation of different kinds of stitches. In other words, by simply changing the gears and the connecting arms between one of these gears and the rock shaft 26, a two to one gear drive or four to one gear drive or any other combination may be used.

The gear 38 is secured to a shaft 41 turning in a bearing 42 which may be formed as a part of the overhanging arm 3. A collar 43 limits the end movement of this shaft.

The gear 40 is secured to the end of a shaft 44 operating in a bearing 45 in the form of a bushing 46 of relatively large diameter and which bushing is clamped to the overhanging arm 3, thus providing a simple way of assembling these various parts on the machine arm as a unit.

Secured to or integral with the shaft 44 is a bevel gear 47 in mesh with a driving bevel gear 48 carried by the top shaft 6. In practice, it is preferred to make this top shaft 6, the driving crank 10 and bevel gear 48 and one member of a coupling 49 all in one piece as this prevents the parts getting out of line and in order to assemble this shaft unit in the overhanging arm 3, the bushing 50 forming a bearing for the shaft 6 is split, being made in two parts and clamped together when in place.

Coupled to the shaft 6 at 49 is the other member 51 of the driving shaft and by this means the needle and cross stitch mechanisms are operated.

The cross thread laying finger 52, Figure 4, is secured at 53 to a hub 54 clamped to the bottom end of the vertical rock shaft 26 and the end 55 of this finger 52 may be provided either with a thread hole or a hook for forming certain of the stitches shown in Figures 5 and 6, a majority of which are made with but one thread manipulating finger or carrier, shown in Figure 4. When,

however, two fingers are used, as illustrated in Figures 1, 2 and 3, a segmental gear 56 is provided having a hub 57 secured to this vertical rock shaft 26 and this segmental gear operates a second segmental gear 58 pivotally supported on the presser bar 14 just above the presser foot 16 and prevented from shifting up and down on this bar by a tongue and groove construction. By this segmental gear mechanism, reverse oscillating or reciprocating motion is given to the thread carrying fingers, one being attached to each segmental gear. For instance, the finger 59 is secured to the side wall of the gear 56 while the other finger 60 is adjustably secured as at 61 to the gear 58 and the thread manipulating ends 62 and 63 of these fingers 59 and 60 may be provided with eyes or hooks for the threads.

In the operation of the machine, assuming the needles and loopers are stitching in the well-known way and that the thread is guided through eyelets and tension to the thread finger 52, see Figure 4, and the finger is shifted back and forth past the two needles at each cycle of the machine, it will produce the cross stitches A, Figure 5, and by causing this finger to operate at every other stitch or cycle, it will produce the cross stitches B, Figure 5, and to shorten its throw, carrying the thread past one needle only, the result will be the snake stitches C, Figure 6, or the laying of the thread in a corrugated form, and by operating both fingers shown in Figures 1, 2 and 3 to deliver threads in the path of the needles, the result will be the production of stitches like D, Figure 5, and by changing the gears from two to one to four to one, stitches similar to E, Figure 6, will be produced, and with this change of gearing, by removing one of the thread fingers, stitches like F, Figure 6, would be the result. Another change of gearing, as a three to one ratio, would produce cross stitches similar to G, Figure 6.

The bent form of arm 32, Figure 4, permits the connecting rod 35 to obtain its movement directly from the shaft 44 by substituting a crank for the gear 40, when a one to one movement is desired, or instead of substituting a crank, by attaching the ball stud 37 to a tapped hole 37a in the gear 40, Figure 1, the same one to one movement is obtained.

The usual cloth plate and other essential details of a sewing machine and the proper presser foot, etc., are all selected and provided according to the character of the work the machine will be required to do, and this also applies to the bottom stitch forming elements, such as the loopers, which are likewise subject to selection according to the requirements.

As hereinbefore stated, the machine is adapted for the making of zig-zag stitches, as shown, for instance, in Figure 10. This, however, requires that the needle have a dwell while it is in the work to prevent the springing of the needle and damage thereto and, therefore, to adapt the machine to the formation of zig-zag stitching, a swinging gate 64, see Figures 7, 8 and 9, is provided, this gate being cast of light weight material, whereby it is of light construction.

This casting 64 comprises the two bearings 12 for the needle bar 11, which bearings are connected by webs 65, 66, 67, 68 and 69 having bearings 70 and 71 in which is located the vertical rock shaft 26, on which this gate 64 is mounted, and is rocked by reason of the arm 31' integral therewith, and whereby the needle bar is vibrated for making the zig-zag stitches 72 in the work 73, Figure 10.

To insure the dwell hereinbefore referred to, of the needle, a triangular cam 73 is carried by the shaft 41 and driven by the gear 38. This cam operates in a forked lever 74, see Figure 7, pivoted as at 75 to the rotary shaft 44 which has its diameter reduced to decrease friction. This lever extends downwardly and is provided with tapped holes 76 to receive the ball stud 37 and by shifting this stud from one hole to the other, more or less needle vibration is obtained for making a wide or narrow stitch.

The forked lever 74 has a rigid member 77 and a yielding member 78 attached by screws 79 to the lever 74, thus forming the forked end of the lever between which the cam 73 rotates. This construction prevents lost motion or shake as the parts become worn since the yielding member 78 compensates for any uneven wear and does this without attention.

The swinging gate 64 is shown clamped to the rock shaft 26 by means of the clamping device or set screw 26' and when so clamped rocks with the shaft although it may, in this form of the improvement rock on the shaft if preferred. By disconnecting the rod 35 from the extension 31', obviously the machine can make the ordinary straight-away stitches either with one or more needles by changing the needle holder or needle bar as the case may be.

By changing the ratio of the gears it follows that on one and the same machine, using the standard parts of that machine, all of the stitches shown in Figs. 5, 6 and 10 may be made by means of the interchangeable rock shafts and the interchangeable connecting arms 30 and 31 and interchangeable gears.

To lubricate the parts, an oil conducting pad 80 is located in the top of a cover 81 secured to the machine arm 3 and this cover forms a receptacle to catch and prevent the oil which travels down the parts, thereby oiling all the working surfaces, from getting on to the materials being worked upon, while the cover also guards and protects the operator.

It is to be understood that by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, I claim:

1. In a sewing machine having an overhanging arm terminating in a head, a shaft supported by said head, a detachable swinging member mounted on said shaft, a needle carried by said swinging member, and means carried by said overhanging arm for operating said swinging member thereby to vibrate the needle transversely of the line of the seam and including a cam and gearing for operating said cam, and also including a short throw detachable connecting means between the swinging member and cam, said connecting means having a shiftable connection thereby to vary the vibratory movement of the needle, said gearing and cam located closer to the head than to the opposite end of the machine, thereby to do away with a long connection between the swinging member and cam.

2. In a sewing machine having an overhanging arm terminating in a head, a rock shaft supported by said head, a swinging member mounted on said shaft, a needle carried by said swinging member,

and means carried by said overhanging arm for operating said swinging member thereby to vibrate the needle and including a cam and gearing for operating said cam and also including connecting means between the swinging member and cam, said connecting means having a shiftable connection thereby to vary the vibratory movement of the needle, and said connecting means including a forked member having a rigid portion and a resilient portion for co-operation with the cam.

3. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, cross-thread laying means comprising an oscillating finger, and means connecting one of said meshing gears with said finger and including a vertically located rock shaft.

4. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, cross-thread laying means comprising an oscillating finger, and means connecting one of said meshing gears with said finger, said transverse shafts and meshing gearing being located closer to the needle end of the machine than to the opposite end thereof, thereby to do away with a long connection between said meshing gearing and finger.

5. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, cross-thread laying means comprising an oscillating finger, and interchangeable means connecting one of said meshing gears with said finger and including a vertically located rock shaft.

6. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, cross-thread laying means comprising an oscillating finger, and interchangeable means connecting one of said meshing gears with said finger and including a vertically located rock shaft.

7. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, cross-thread laying means comprising an oscillating finger, a vertically supported rock shaft carrying said finger, and interchangeable means connecting one of said meshing gears with said rock shaft.

8. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism cross-thread laying means comprising an oscillating finger, and an interchangeable lever connection between one of said meshing gears and said finger and including a vertically located rock shaft.

9. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, readily replaceable meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, cross-thread laying means comprising an oscillating finger, and readily replaceable short throw means connecting one of said meshing gears with said finger, said readily replaceable gearing varying in ratio suitable to vary the formation of the stitches, said transverse shafts and meshing gearing being located closer to the needle end of the machine than to the opposite end thereof thereby to do away with a long connection between said meshing gearing and finger.
10. In a sewing machine having an overhanging arm, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, meshing gearing carried by said transverse shafts and operated from said driving shaft, needle mechanism, and cross-thread laying mechanism comprising a pair of oscillatory fingers, a pair of segmental gears, each carrying one of said fingers, a presser foot bar, and a rock shaft, one finger mounted on the presser bar and the other on the rock shaft, and means connecting one of said intermeshing gears with said rock shaft.
11. In a sewing machine having an overhanging arm terminating in a head, the combination of feeding and looper mechanisms, a bottom rotary driving shaft for operating them, a top driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely to said arm, intermeshing gearing carried by said transverse shafts and operated from said driving shafts, a vertically supported rock shaft carried by the head, a swinging member carried by said rock shaft, a needle carried by said member, and means connecting one of said intermeshing gears with said swinging member, thereby to vibrate the needle.
12. In a sewing machine having an overhanging arm terminating in a head, a driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely to said arm, intermeshing gearing carried by said transverse shafts and operated from said driving shaft, a vertically supported rock shaft carried by the head, a swinging member carried by said rock shaft, a needle carried by said member, and means connecting one of said intermeshing gears with said swinging member, thereby to vibrate the needle, said connecting means including a cam separate from said gearing but operated by said intermeshing gear mechanism.
13. In a sewing machine having an overhanging arm terminating in a head, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable intermeshing gearing carried by said transverse shafts and operated from said driving shaft, a vertically supported rock shaft carried by the head, a swinging member carried by said rock shaft, a needle carried by said member, and interchangeable means connecting one of said gears with said swinging member.
14. In a sewing machine having an overhanging arm terminating in a head, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable intermeshing gearing carried by said transverse shafts and operated from said driving shaft, a vertically supported rock shaft carried by the head, a swinging member carried by said rock shaft, a needle carried by said member, and interchangeable means connecting one of said gears with said swinging member and including a cam operated by said gear mechanism, thereby to vibrate the needle, said connecting means having a shiftable connection thereby to vary the vibratory movement of the needle.
15. In a sewing machine having an overhanging arm terminating in a head, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable intermeshing gearing carried by said transverse shafts and operated from said driving shaft, a vertically supported rock shaft carried by the head, a swinging member carried by said rock shaft, a needle carried by said member, and interchangeable means connecting one of said gears with said swinging member and including a cam operated by said gear mechanism, thereby to vibrate the needle, said connecting means having a shiftable connection thereby to vary the vibratory movement of the needle.
16. In a sewing machine having an overhanging arm terminating in a head, a driving shaft extending lengthwise thereof, a pair of shafts supported by and transversely to said arm, interchangeable intermeshing gearing carried by said transverse shafts and operated from said driving shaft, a vertically supported rock shaft carried by the head, a swinging member carried by said rock shaft, a needle carried by said member, an interchangeable means connecting one of said gears with said swinging member and including a cam operated by said gear mechanism, thereby to vibrate the needle, said connecting means having a shiftable connection thereby to vary the vibratory movement of the needle, and said connecting means including a forked member having a rigid portion and a resilient portion for co-operation with the cam.
17. In a sewing machine having an overhanging arm terminating in a head, a needle carried thereby, the combination of feeding and looper mechanisms, a bottom rotary driving shaft for operating them, a top driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driving shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head, a rock shaft member therefor, and means connecting one of said rocking elements and one of said first intermeshing gears.
18. In a sewing machine having an overhanging arm terminating in a head, a needle carried thereby, a driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, interchangeable intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driving shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head, a rock shaft member therefor, and means connecting one of said rocking elements and one of said first intermeshing gears.
19. In a sewing machine having an overhanging arm terminating in a head, a needle carried thereby, a driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, readily replaceable intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driv-



ing shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head, a rock shaft member therefor, and readily replaceable means connecting one of said rocking elements and one of said first intermeshing gears.

20. In a sewing machine having an overhanging arm terminating in a head, a needle carried thereby, the combination of feeding and looper mechanisms, a bottom rotary driving shaft for operating them, a top driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driving shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head and comprising a rock shaft and means carried thereby for effecting an ornamental stitch, and means connecting said rocking member directly with one of said first intermeshing gears.

21. In a sewing machine having an overhanging arm terminating in a head, the combination of feeding and looper mechanisms, a bottom rotary driving shaft for operating them, a top driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driving shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head and comprising a vertically supported rock shaft member and a swinging gate and a needle carried thereby for making an ornamental stitch, and means connecting one of said rocking elements and one of said first intermeshing gears.

22. In a sewing machine having an overhanging arm terminating in a head, a needle carried thereby, a driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, interchangeable intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driving shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head and comprising a rock shaft and means carried thereby for effecting an ornamental stitch, and means connecting said rocking member and one of said first intermeshing gears.

23. In a sewing machine having an overhanging arm terminating in a head, a driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, interchangeable intermeshing gearing carried by said transverse shafts, intermeshing gearing carried by said driving shaft and one of said transverse shafts for operating said first gearing, a vertically supported rocking member carried by said head and comprising a vertically supported rock shaft and a swinging gate and a needle carried thereby for making an ornamental stitch, and interchangeable means connecting one of said rocking members and one of said first intermeshing gears.

24. In a sewing machine having an overhanging arm terminating in a head, the combination of feeding and looper mechanisms, a bottom rotary driving shaft for operating them, a top rotary driving shaft extending lengthwise of said arm, a pair of shafts supported by and transversely of said arm, one above the other, interchangeable intermeshing gearing carried by said

transverse shafts, intermeshing gearing carried by said top driving shaft and the top transverse shaft for operating said first gearing, a vertically supported rocking member and including a rock shaft carried by said head, and interchangeable means connected with the top gear of the pair and with the rocking member for rocking it.

25. In a sewing machine having a top arm and stitching mechanism and cross thread laying mechanism comprising a pair of oscillatory fingers, a pair of segmental gears, each carrying one of said fingers, a presser foot bar and a rock shaft, one finger mounted on the presser bar and the other on the rock shaft, and gear mechanism carried by the top arm and connected with said rock shaft and including a pair of transverse shafts.

26. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head, stitching and feeding mechanisms carried thereby, an oscillating cross-thread laying means comprising one or more fingers, means for supporting either or both of said fingers adjacent to the stitching mechanism, an over-size housing at the side of said arm adapted to receive sets of different sizes of gears, gear operating means for said fingers comprising a pair of gears of one ratio accessibly located in said housing and readily removable therefrom whereby they may be interchanged with sets of gears of different ratio, and connecting means between said fingers and said gears whereby, by changing said gears or said connecting means or both, either or both of said fingers is operative thereby to produce on the same standard machine simultaneously with the stitching many different forms of ornamental cross stitches.

27. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head, stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, an oscillating cross thread laying means comprising one or more fingers, means for supporting either or both of said fingers adjacent to the stitching mechanism, readily replaceable operating means actuated by said shaft, and connecting means between said fingers and said replaceable operating means for effecting on the same standard machine many different forms of stitches upon the interchanging of said operating means.

28. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head, stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, an oscillating cross thread laying means comprising one or more fingers, means for supporting either or both of said fingers adjacent to the stitching mechanism, readily replaceable operating means actuated by said shaft, and readily replaceable connecting means between said fingers and said replaceable operating means for effecting on the same standard machine many different forms of stitches upon the interchanging of either or both of said replaceable means.

29. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head, stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, an oscillating cross thread laying means comprising one or more fingers, means for supporting either or both of said fingers adjacent to the stitching

mechanism, readily replaceable gear operating means actuated by said shaft, and connecting means between said fingers and said replaceable gear operating means for effecting on the same  
 5 standard machine many different forms of stitches upon the interchanging of said gear operating means.

30. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head,  
 10 stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, an oscillating cross thread laying means comprising one or more fingers, means for supporting either or  
 15 both of said fingers adjacent to the stitching mechanism, readily replaceable gear operating means actuated by said shaft, and readily replaceable connecting means between said fingers and said replaceable gear operating means for effecting on the same standard machine many  
 20 different forms of stitches upon the interchanging of either or both of said replaceable means.

31. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head,  
 25 stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, an oscillating cross thread laying means comprising one or more fingers, a rock shaft for supporting either or both of said fingers adjacent to the stitching  
 30 mechanism, readily replaceable operating means actuated by said shaft, and readily replaceable connecting means between said rock shaft and said readily replaceable operating means for effecting on the same standard machine many  
 35 different forms of stitches upon the interchanging of either or both of said readily replaceable means.

different forms of stitches upon the interchanging of either or both of said readily replaceable means.

32. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head, stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, an oscillating cross thread laying means comprising one or more fingers, means for supporting either or  
 5 both of said fingers adjacent to the stitching mechanism, operating means for said fingers, and readily replaceable connecting means between said fingers and said operating means for effecting on the same standard machine many different  
 10 forms of stitches upon the interchanging of said connecting means.

33. A sewing machine for producing a variety of stitch formations comprising a standard supporting base, an overhanging arm and head, stitching and feed mechanisms carried thereby, an actuating shaft carried by said arm, a rock shaft carried by the head and adapted to carry an oscillating cross thread laying means comprising one or more fingers or a needle carrying vibrating  
 25 means operative to form straight-away stitches or zig-zag stitches, readily replaceable operating means operated by said actuating shaft, and readily replaceable connecting means between said rock shaft and said readily replaceable operating means for effecting on the same standard  
 30 machine many different forms of stitches upon the interchanging of said operating means or said connecting means or both.

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