

Dec. 12, 1950

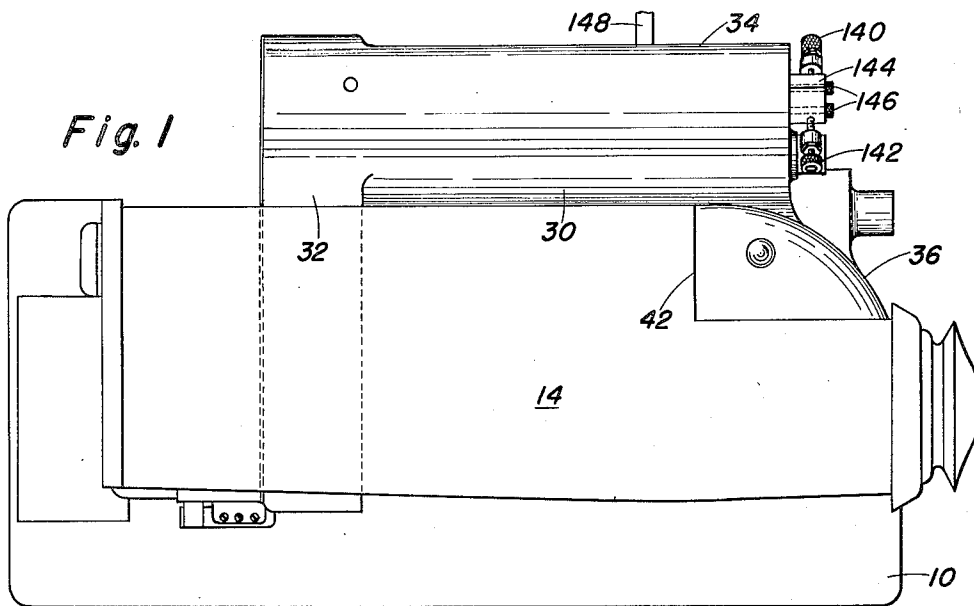
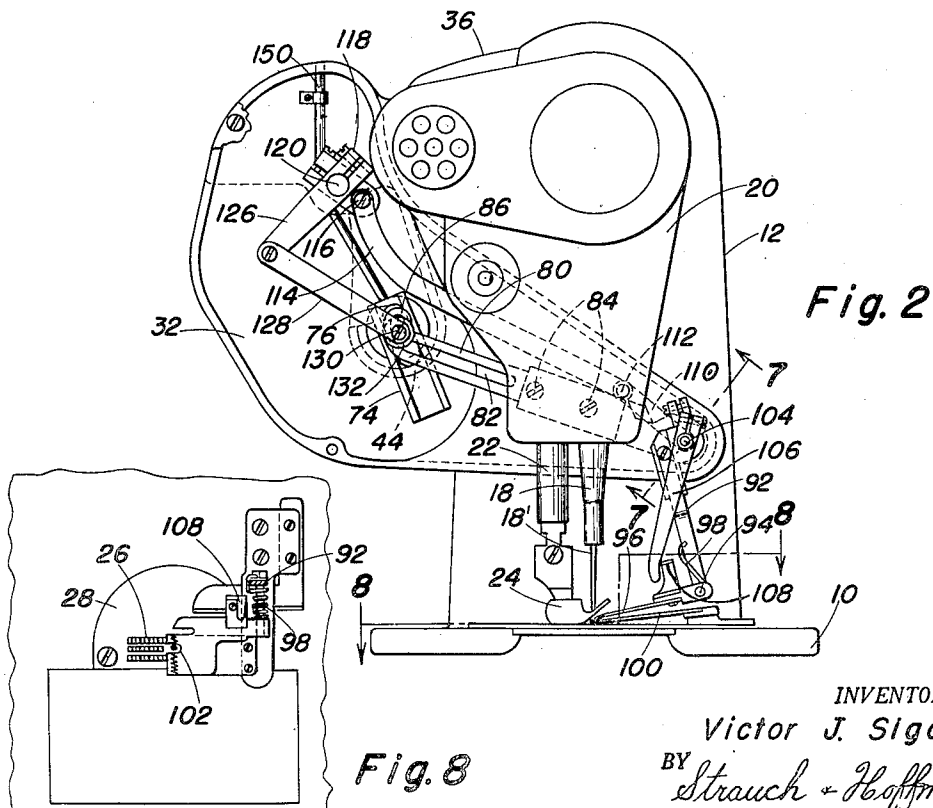
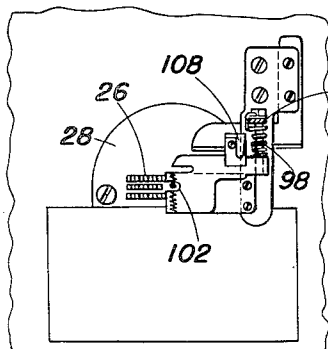
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2,533,291

RUFFLER ATTACHMENT FOR SEWING MACHINES

Filed June 23, 1947

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

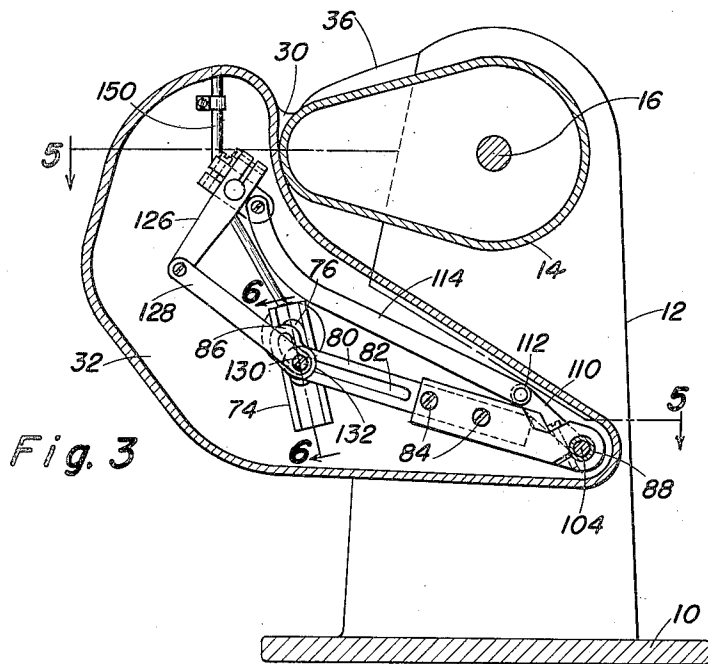


Fig. 3

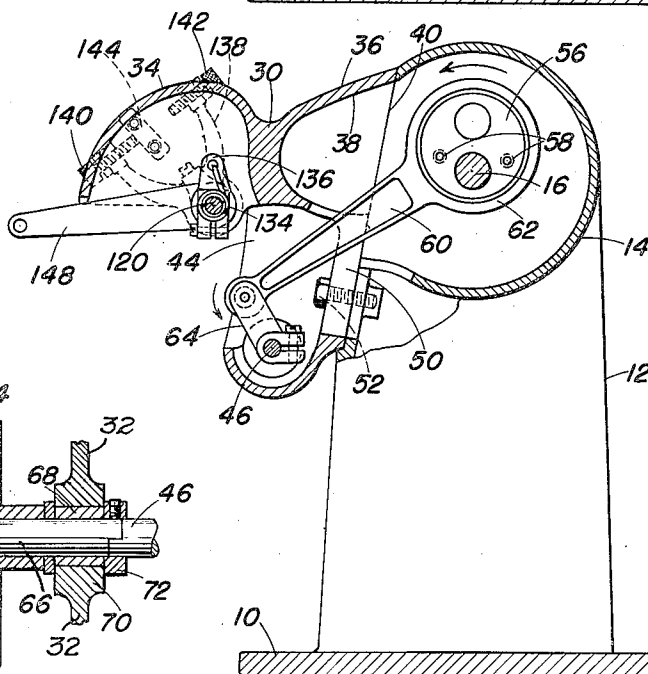


Fig. 4

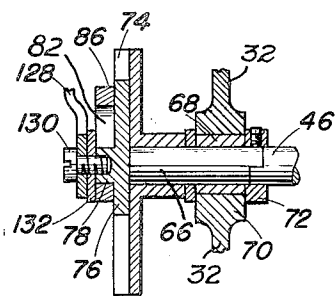


Fig. 6

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UNITED STATES PATENT OFFICE

2,533,291

RUFFLER ATTACHMENT FOR SEWING MACHINES

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10 Claims. (Cl. 112—134)

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This invention relates to ruffler attachments for sewing machines, and has for its general object and purpose to provide certain novel and practical improvements in ruffler attachments of the type heretofore disclosed in Patent No. 2,245,877, dated June 17, 1941.

In the issued patent, the operating mechanism for the ruffler blade is enclosed within a housing attached to the outer side of the needle bar guide head of the sewing machine, and is connected with and actuated by the vertically reciprocating needle bar. In the present instance, the ruffling mechanism is actuated from the main drive shaft of the machine mounted in the horizontal arm of the sewing machine, and it is one of the important objects of the present invention to provide a one-piece housing structure for the ruffling mechanism and parts of the power take-off connection with the main shaft of the machine rigidly mounted at the rear side of the machine arm and operatively supporting the ruffler blade actuating mechanism at the inner side of the needle bar guide head of the machine.

It is another object of the invention to provide mechanism of improved and simplified construction for transmitting oscillatory motion to the ruffling blade from the rotating main shaft of the machine in timed relation with the vertical reciprocatory movement of the needle.

A further object of the invention resides in the provision of very simple and easily operated means for regulating or adjusting the effective stroke of the ruffling blade to vary the width of the ruffles formed thereby.

It is an additional object of the invention to provide operating means for the ruffler blade embodying a rock shaft, and a radially slidable element movable to and from a neutral position with respect to the axis of said shaft, together with improved means automatically operable in the movement of said element to neutral position to lift the ruffling blade out of operative contact with the material to be ruffled.

Finally, it is the purpose of the present invention to provide a ruffling attachment for sewing machines as above characterized, embodying a very compact organization of cooperating parts of simple and rugged structural form, easily accessible for inspection and repair, and providing an attachment unit of this kind readily applicable to standard types of sewing machines with a minimum of alteration.

With the above and other subordinate objects in view, the invention comprises the improved ruffling attachment for sewing machines and the construction and relative arrangement of its sev-

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eral parts, as will hereinafter be more fully described, illustrated in the accompanying drawings, and subsequently incorporated in the subjoined claims.

In the drawings, wherein I have shown one simple and practical embodiment of my present improvement, and in which similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a top plan view, illustrating one embodiment of my invention as applied to a well known type of sewing machine;

Figure 2 is an end elevation, the cover plate for the attachment housing arm being removed;

Figure 3 is a vertical transverse section taken substantially on the line 3—3 of Figure 5;

Figure 4 is a similar transverse sectional view taken substantially on the line 4—4 of Figure 5;

Figure 5 is a horizontal sectional view taken substantially on the line 5—5 of Figure 3;

Figure 6 is a detail longitudinal sectional view taken substantially on the line 6—6 of Figure 3;

Figure 7 is a similar detail longitudinal section taken on the line 7—7 of Figure 2; and

Figure 8 is a detail horizontal section taken substantially on the line 8—8 of Figure 2.

For the purpose of illustrating one application of my present invention, I have shown the essential parts of a sewing machine of the well known Singer 400-W class. This machine includes the bed plate 10 having a vertical pedestal 12 integrally formed with or secured to one end thereof. This pedestal supports the horizontal hollow arm 14 in vertically spaced relation above the base plate 10, and in this arm, the main operating shaft 16 for the vertically reciprocating needle bar 18 mounted in the guide head 20 on the end of arm 14 is journaled. Since the operating connections between said main shaft and the needle bar are conventional and well known, they will not be herein further described.

The vertically movable bar 22 carrying presser foot 24 is also mounted in the head 20 in conventional manner, said presser foot cooperating with the usual four-motion feed dog 26 mounted in the throat plate 28, as shown in Figure 8 of the drawings.

The ruffling mechanism of the present invention is carried by a housing structure comprising an integral casting having an elongated portion 30 adapted to extend longitudinally along the rear side of the sewing machine arm 14 and provided at one of its ends with an angularly projecting hollow arm 32 extending forwardly from the part 30 beneath the machine arm 14 and at the inner side of the needle bar guide head 20.

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The part 33 of the casting includes a hollow downwardly opening portion 33 longitudinally coextensive with the casting, and of substantially the same external contour as the upper end portion of the arm 32. At the opposite end of the part 33, the casting is formed with a transversely and longitudinally projecting nose portion 38 having a cavity 38 to register with an opening 40 formed through the rear side of the arm 14 at its juncture with the pedestal 12. This nose piece fits within the recess 42 in the rear side of arm 14, as seen in Figure 1 of the drawings. The part 33 of the casting further includes the depending, longitudinally extending portion 44 coextensive therewith and integral with the inner side wall of the arm 32. At its lower end, part 44 is of semi-cylindrical form and opens at the upper side thereof to receive the rock shaft 46, which is journaled at one of its ends in a suitable bearing 48 on one end wall of said part 44 of the casting. The part 33 of the casting at the open side of cavity 38 is provided with a downwardly extending slot 50, and at each side of said slot, the casting is rigidly secured to the pedestal 12 by means of one or more bolts or screws, indicated at 52.

To the main shaft 16 of the machine within the upper end of pedestal 12, a wide sprocket 54 is suitably fixed for engagement by the usual cleated belt driven by a motor (not shown) mounted on the machine base. To one side of this sprocket, an eccentric 56 is rigidly fixed relative to shaft 16 by means of screws indicated at 58. This eccentric is peripherally circumscribed by the strap 62 on one end of the pitman 60, which is pivotally connected at its other end to a crank arm 64 suitably fixed to the rock shaft 46, said pitman extending rearwardly through the slot 50 in the wall of the part 33 of the housing structure. It will therefore be apparent that, in the rotation of the main shaft 16 of the machine, the eccentric 56 and pitman 60 transmit a rocking or oscillating motion to the shaft 46. At its other end, the shaft 46 is detachably coupled to one end of a shaft 66 mounted in a bearing sleeve 68 suitably fixed in a boss 70 integral with the side wall of the housing arm 32, and with which a collar 72 holding the shafts 46 and 66 in coupled relation is in contact.

Within the housing arm 32, a channelled guide arm 74 is rigidly fixed in any suitable manner to the end of shaft 66, to extend diametrically across the shaft end and in downwardly projecting relation therefrom. In the channel of this arm, a block 76 is slidably mounted. The block carries a pivot stud 78 having a tapped bore, which extends through the slot 32 in a lever 80. Preferably, this lever comprises two sections separably connected by means of the screws indicated at 84. The upper lever section provided with slot 82 has an upwardly curved upper end portion 86, in which the upper closed end of slot 82 terminates, so that in one position of the block 76 said end of the slot and the pivot stud 78 are in coaxial relation with the shaft 66. The lower section of lever 80 is rigidly clamped or otherwise fixed to the inner end of a tubular shaft 88 journaled in a suitable bearing in the boss 90 formed on the outer side wall of housing arm 32 at its lower forward end. To the other end of this tubular shaft, a downwardly extending arm 92 is securely fixed, and carries a pivot stud 94 at its lower end, upon which the forward end of the ruffling blade 96 is mounted, said blade being yieldingly urged downwardly by the spring

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98 to retain the rear end of said blade in operative engagement with the material to be ruffled, which is drawn from a spool or reel between said ruffling blade 96 and the lower horizontally inclined, fixed yieldable blade 100. The base fabric material is intermittently fed by the feed dog 26 beneath the fixed blade 100 and under the presser foot 24. As herein shown, the rear end edge of the ruffling blade 96 is toothed or serrated, and said blade and the blade 100 are notched as shown at 102 in Figure 8, to accommodate the vertically reciprocating needle 18'.

Within the tubular shaft 88, a second shaft 104 is mounted for independent oscillatory motion, and to the outer end of this shaft the downwardly extending arm 106 is fixed for engagement at its lower end with a transversely disposed lug 108 carried by the ruffling blade 96 adjacent the forward pivoted end thereof. To the inner end of the shaft 104, an upwardly extending arm 110 is secured and is pivotally connected as at 112 to the lower end of a link 114. The upper end of this link is pivotally connected at 116 to an arm 118, secured to the end of a second rock shaft 120, projecting within the housing arm 32, said rock shaft being suitably journaled in bearing bosses 122 and 124 on the inner wall of housing arm 32, and the opposite end of the part 34 of the housing casting. Within the housing arm 32, a second downwardly projecting crank arm 126 is secured to rock shaft 120, and the lower end thereof is pivotally connected by link 128 with a screw 130, threaded into the tapped bore of stud 78 on the block 76. Preferably, a spacing washer 132 is interposed between the end of link 128 and lever 80.

The rock shaft 120 is yieldingly urged in one direction by the torsion spring 134 surrounding said shaft and fixed at one of its end to an arm 136 secured to the shaft, and at its other end to the inner side wall of the housing arm 32. This spring tends to rotate shaft 120 in clockwise direction, as seen in Figure 2, and hold the slide block 76 in a neutral coaxial position relative to shaft 66.

To the other end of the rock shaft 120, externally of the part 34 of the housing casting, an upwardly extending member 138 of wish-bone form is secured, as seen in Figure 4 of the drawings. In a boss on the upper end of each arm of member 138 a screw 140 and 142 respectively is adjustably threaded. Between said arms, a stop block 144 is secured to the end wall of part 34 of the housing by the screws 146.

Within the lower open side of the housing part 34, a lever 148 is rigidly secured to the shaft 120 and extends rearwardly therefrom and beyond the wall of the housing part 34. To the latter end of said lever suitable manually operable means such as a foot treadle is adapted to be connected to oscillate the shaft 120 in a counterclockwise direction against the resistance of spring 134. If desired, suitable latch means may be provided to releasably retain the lever 148 in its operated position.

In Figure 5 of the drawings, I have shown a tube 150 connected with the bearing sleeve 68 and attached to the inner side wall of the housing arm 32. The upper end of this tube opens through the top wall of the housing arm and through the same, lubricating oil may be supplied to the shaft 66. Suitable provision may also be made for supplying lubricant to the other bearings for the shafts 46, 88 and 120.

In mounting the attachment, the nose portion

36 of the housing structure is fitted into the recess 42 of the sewing machine arm to position the housing arm 32 beneath the machine arm 14 with the ruffling blade 96 in accurately superposed relation with the fixed blade 100. The attaching screws 52 are then tightened to rigidly fix the housing structure in its mounted position. The eccentric actuated rod 60 is then connected with the arm 64 on shaft 46.

Assuming that screw 140 is in contact with stop block 144, and the slide block 76 in its neutral position in arm 74, the screw 142 is now adjusted in accordance with the desired predetermined width of ruffle to be formed by the blade 96. Upon the downward movement of lever 148, the shaft 120 is rocked in counterclockwise direction, and through link 128, the slide block 76 is moved downwardly in the channel of guide arm 74 away from the axis of shaft 66 until the screw 142 contacts stop block 144. In this adjustment the pivot stud 78 moves freely in the slot 82 of lever 80, and thereafter transmits oscillating motion to said lever and shaft 38 from arm 74, in the oscillatory motion of rock shaft 46 by the eccentric 56, to an extent determined by the location of said pivot stud 78 with respect to the axis of said rock shaft. Thus the extent of reciprocating motion or throw of the ruffling blade 96 may be varied by adjustment of stop screw 142 to form ruffles of a desired width.

As above noted, the base fabric to which the ruffled material is to be stitched is fed over the bed plate 10 of the machine beneath the fixed blade 100 and presser foot 24. This yieldable blade 100 provides a base with which the toothed end of the ruffling blade 96 cooperates to gather or ruffle the strip of material overlying the blade 100 in each rearward movement of ruffling blade 96 towards the presser foot 24 and positions the ruffle in the path of vertical reciprocation of needle 18' to be stitched to the base fabric. In Figure 2 of the drawings, the slide block 76 is shown in adjusted position relative to the axis of rock shaft 46 for forming a narrow ruffle, while in Figure 3 the slide block has been further adjusted away from the axis of said shaft to form a relative wide ruffle. In Figure 2, the blade 96 is shown near the end of its ruffling stroke.

Operation of the ruffling mechanism may be discontinued at any time when the ruffling blade 96 is in retracted position, by releasing the lever 148, whereupon spring 134 rocks the shaft 120 in clockwise direction and moves the slide block 76 upwardly in the arm 74 to position the stud 78 in the upper curved end of slot 82 in lever 80 and in coaxial relation with the shaft 46, at which time screw 140 carried by member 138 is engaged with stop block 144. Thus, in the continued actuation of rock shaft 46 by eccentric 56, no oscillating motion will be transmitted to lever 80, so that reciprocating movement of the ruffling blade 96 is discontinued. Simultaneously with the movement of the slide block to its neutral position, shaft 104 is oscillated in counterclockwise direction within the tubular shaft 88 as the link 114 and arm 110 on said shaft move into a substantially straight-line position. Thus arm 136 on the outer end of shaft 104, coacting with lug 108, will slightly rock the ruffling blade 96 upwardly against the resistance of spring 98 to release the gripping pressure of said blade upon the strip of material, so that the latter can be removed.

It will be understood that the eccentric 56 may be so adjusted relative to the axis of the shaft 16

of the machine that rock shaft 46 will be actuated in properly timed relation with the vertical reciprocation of needle bar 18, so that the ruffle forming stroke of blade 96 will take place in the upstroke of the needle 18', as in Patent No. 2,245,877, and thus avoid possible interference by the blade 96 with the downward stroke of the needle and breakage of the latter.

Preferably, the outer side wall of the housing arm 32 at its rear end is provided with an access opening, normally closed by the cover plate 152, and the opposite side wall of said arm at its forward end is also provided with an access opening normally closed by the cover plate 154.

From the above description and the accompanying drawings, it is believed that the construction and several advantages of my present improvements will be readily understood. It will be seen that I have provided an attachment of this kind, having a novel one-piece housing structure for the actuating mechanism for the ruffling blade, with means for easily, quickly, and accurately mounting the same in applied position upon the sewing machine arm, and which will automatically establish the ruffling blade in accurate operative position with respect to the stitching mechanism, and locate the rock shaft arm 64 in relation to the eccentric actuating rod 60 so that the operative connection between these parts can be quickly made at the rear open side of the part 44 of the housing shaft. It will be noted that all parts of the actuating mechanism are substantially concealed by the housing structure, which is of pleasing design, so that the attachment adds to the ornamental appearance of the machine as a whole. It will further be appreciated that I have materially simplified the means for selectively adjusting the position of the slide block and the operative connections between said block, the eccentric actuated rock shaft, and the oscillating lever for actuating the ruffling blade. Also, the means for lifting the ruffling blade to inoperative position as the slide block is moved to neutral position is further simplified in certain respects. Thus the present invention provides a sewing machine attachment for intermittent or continuous ruffling, embodying a minimum number of elements of simple and rugged structural form, conducing to reasonably low production and maintenance costs, and which is easily applicable to standard makes of sewing machines with minimum alteration thereof.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In combination with a sewing machine having a supporting arm for stitching mechanism and a main operating shaft mounted therein; a ruffler attachment comprising an elongated housing structure of substantially coextensive length with the machine arm and means for rigidly mounting said structure on the rear side of said arm, said housing structure at one end having a part extending downwardly and forwardly beneath the machine arm adjacent to the stitch-

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ing mechanism, a ruffling blade mounted on the lower end of said housing part, actuating mechanism for said blade mounted in the housing structure including a rock shaft, the housing wall at its other end having an opening communicating with the interior of the machine arm and means operatively connecting said rock shaft through said opening within the other end of said housing structure to the main shaft of the machine.

2. The combination defined in claim 1, wherein the mounting means for said housing structure includes a forwardly offset part of said structure at said other end thereof fitted within a recess in the rear side of the machine arm.

3. The combination defined in claim 2, in which said offset part of the housing structure is provided with a vertically extending slot, and the operative connection between said rock shaft and main shaft comprises an eccentric actuated pitman extending from the main shaft through said slot.

4. In combination with a sewing machine arm having a main shaft therein and stitching mechanism mounted in one end of said arm, said arm at its other end having a recess in the rear side thereof; an elongated housing structure extending longitudinally along the rear side of said arm and having an angularly offset portion at one end fitted within said recess, means securing said structure at its latter end in rigidly fixed relation to the machine arm, said housing structure at its other end having a hollow arm extending downwardly and forwardly beneath the machine arm at the inner side of the stitching mechanism, a ruffling blade oscillatably mounted on the lower end of said hollow arm, a longitudinally disposed rock shaft mounted in the housing structure, means within said housing arm operatively connecting one end of said shaft to the ruffling blade, and an actuating connection between the main shaft and said rock shaft at the fixed end of the housing structure.

5. The combination defined in claim 4, wherein said connecting means between the ruffling blade and rock shaft includes a member radially adjustable to and from a neutral position in coaxial relation with said shaft, together with adjusting means for said member comprising a second rock shaft mounted in the housing structure and operatively connected at one end to said member, and means yieldingly resisting rocking motion of said shaft in one direction and urging said adjustable member to its neutral position.

6. The combination defined in claim 5, in which said second rock shaft at its other end extends externally of the housing structure, a stop member fixed to said structure, and a pair of relatively adjustable elements mounted on said shaft end at opposite sides of said stop member to engage the latter and limit rocking movement of said shaft in each direction.

7. The combination defined in claim 5, together with additional means operatively connected with said second rock shaft to move the

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ruffling blade out of ruffle forming position in the movement of said adjustable member to neutral position.

8. In combination with a sewing machine arm having a main shaft therein and stitching mechanism mounted in one end of said arm, said arm at its other end having a recess therein, an elongated housing structure extending longitudinally along one side of said arm and having a part at one end fitted within said recess, means securing said structure at its latter end in rigidly fixed relation to the machine arm, said housing structure at its other end having a hollow extension at the inner side of the stitching mechanism terminating in advance of the needle, a ruffling blade oscillatably mounted on said housing extension, a longitudinally disposed rock shaft mounted in the housing structure, means within said housing extension operatively connecting one end of said shaft to the ruffling blade, and an actuating connection between the main shaft and said rock shaft at the fixed end of the housing structure.

9. In combination with a sewing machine having a main needle operating shaft, a ruffling unit comprising a supporting structure attached to one side of said machine, an oscillatory shaft mounted in said structure, a ruffling blade carried by said shaft in advance of the machine needle, a pair of parallel rock shafts journaled at their opposite ends in said supporting structure and disposed between horizontal planes intersecting the axes of said main and oscillatory shafts, means operatively connecting the main shaft with one of said rock shafts, connecting means between the latter rock shaft and said oscillatory shaft to selectively govern the oscillating motion of the ruffling blade including a member movable to and from an inoperative neutral position in co-axial relation to said rock shaft, means operatively connecting the other rock shaft to said member to adjustably position said member, and means biasing said latter rock shaft in one direction to normally retain said member in co-axial neutral position with respect to said first named rock shaft.

10. The combination defined in claim 9, together with an adjustable member carried by the second named rock shaft and stop means on the supporting structure engaged by said member to limit rocking motion of said shaft in opposition to said biasing means and movement of said member from its neutral position.

VICTOR J. SIGODA.

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The following references are of record in the file of this patent:

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