April 3, 1962 R. E. JOHNSON 3,027,857

BRACKET-ARM DESIGN FOR ZIGZAG SEWING MACHINES

Filed Jan. 25, 1960 5 Sheets-Sheet 1

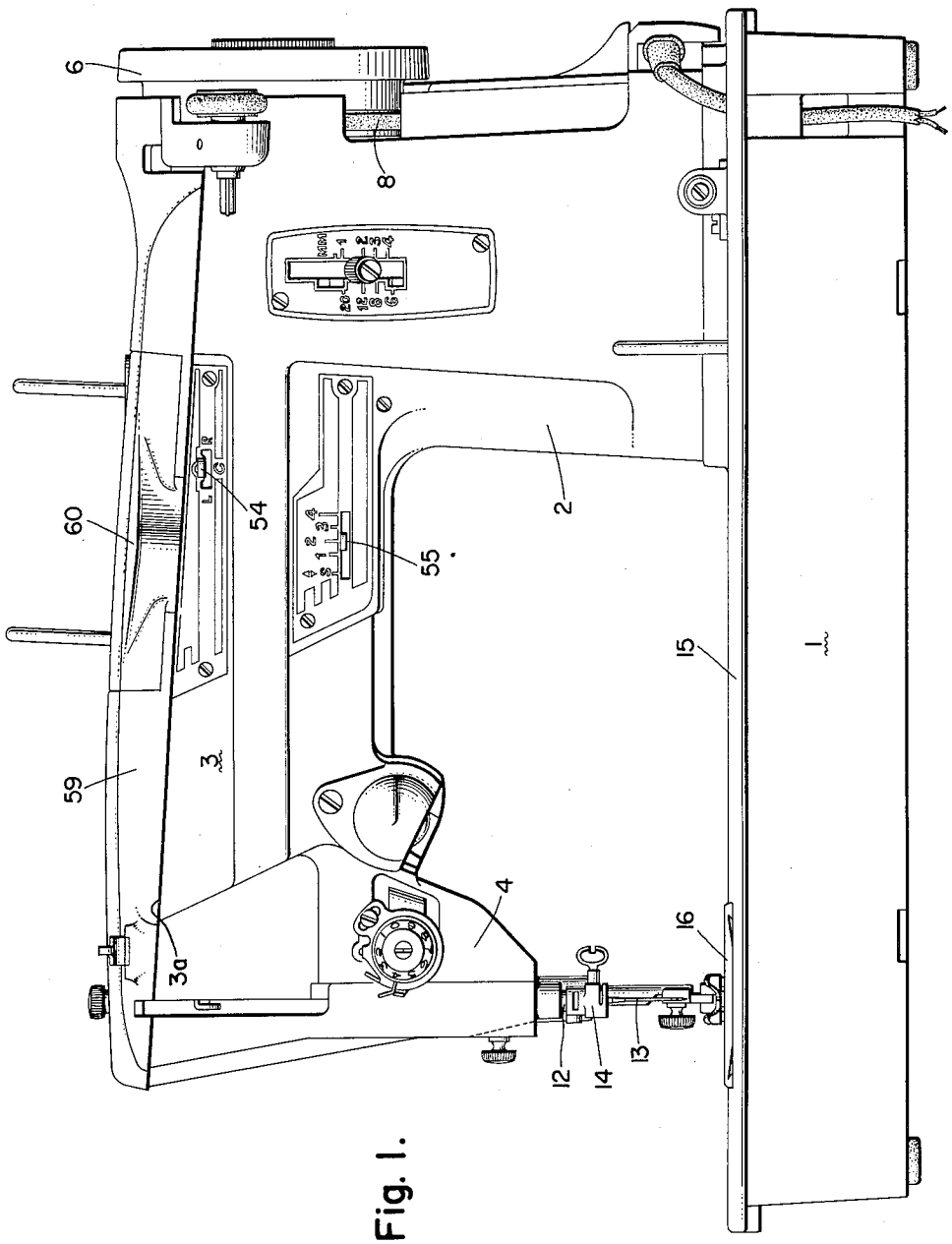


Fig. 1.

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BRACKET-ARM DESIGN FOR ZIGZAG SEWING MACHINES

Filed Jan. 25, 1960 5 Sheets-Sheet 2

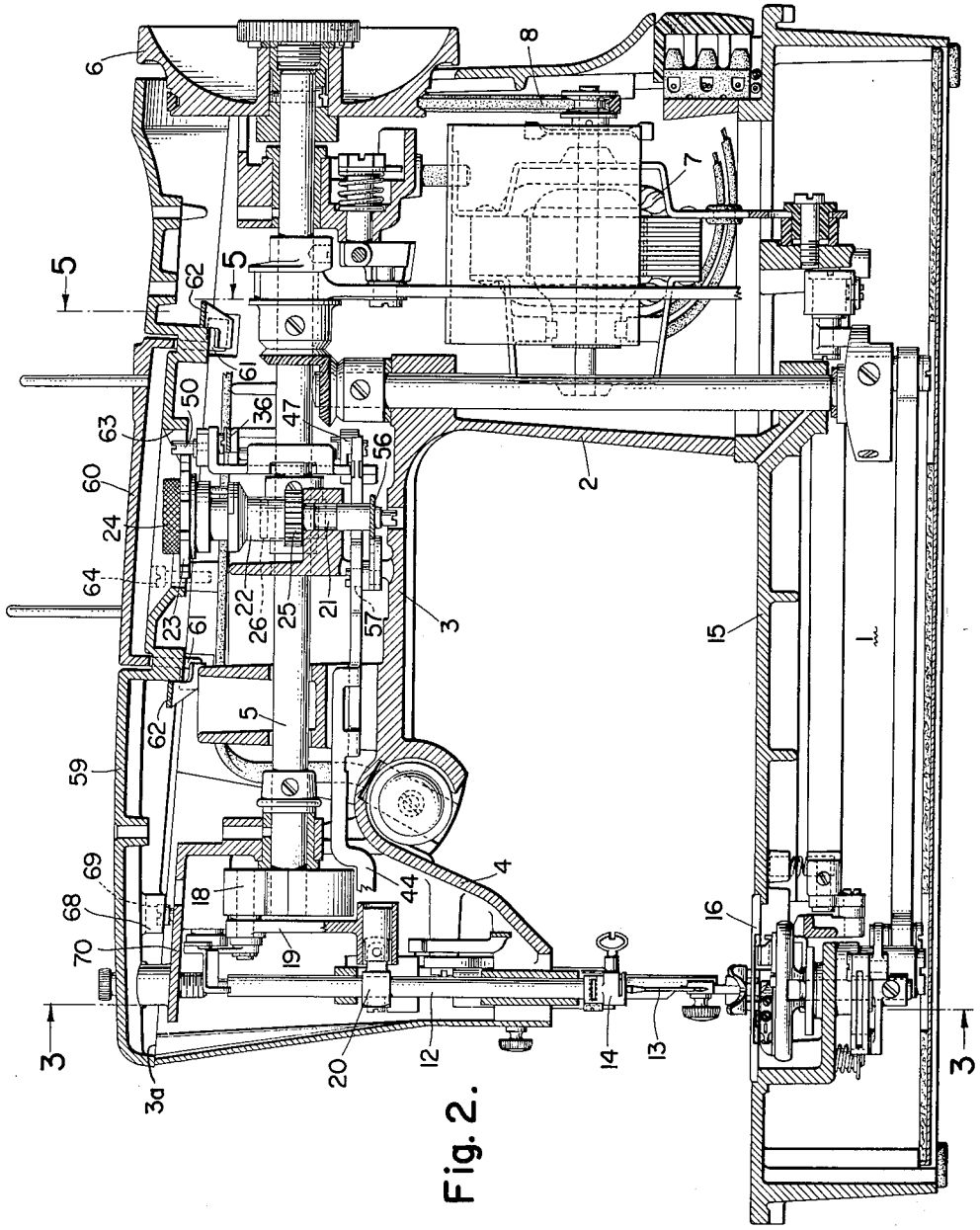


Fig. 2.

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BRACKET-ARM DESIGN FOR ZIGZAG SEWING MACHINES

Filed Jan. 25, 1960 5 Sheets-Sheet 3

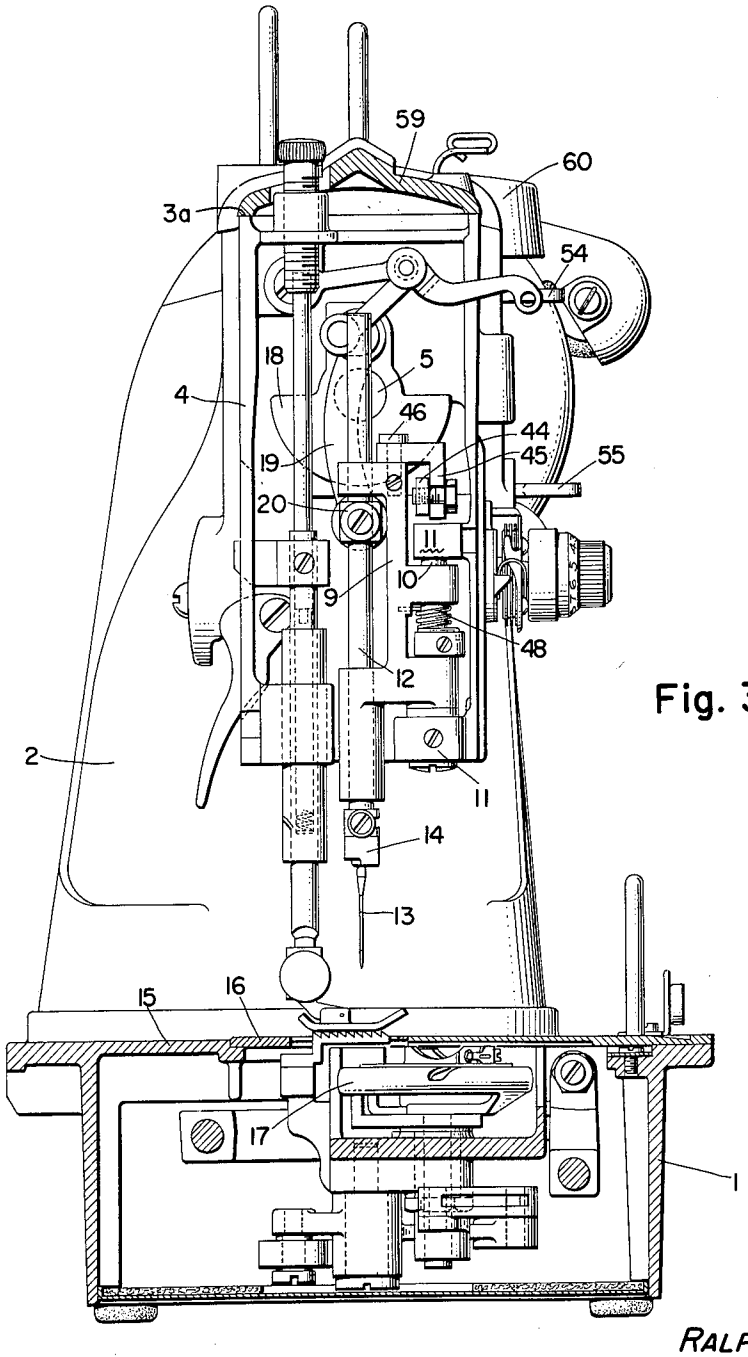


Fig. 3.

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BRACKET-ARM DESIGN FOR ZIGZAG SEWING MACHINES

Filed Jan. 25, 1960 5 Sheets-Sheet 4

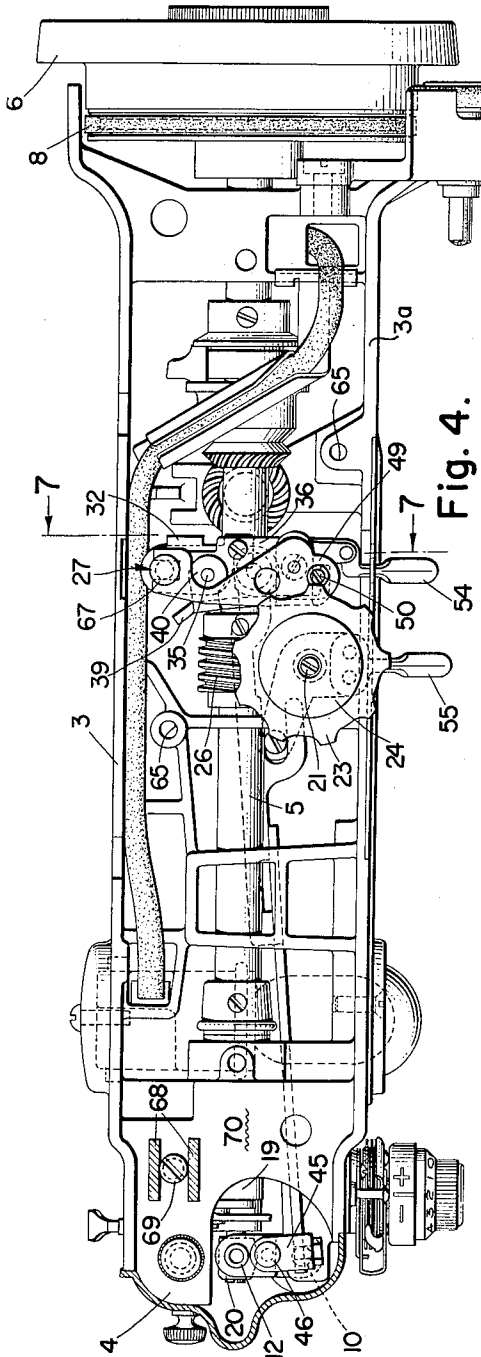


Fig. 4.

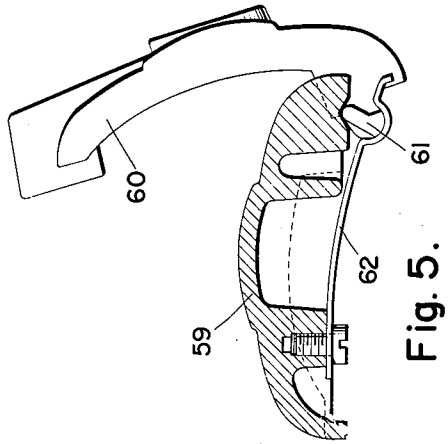


Fig. 5.

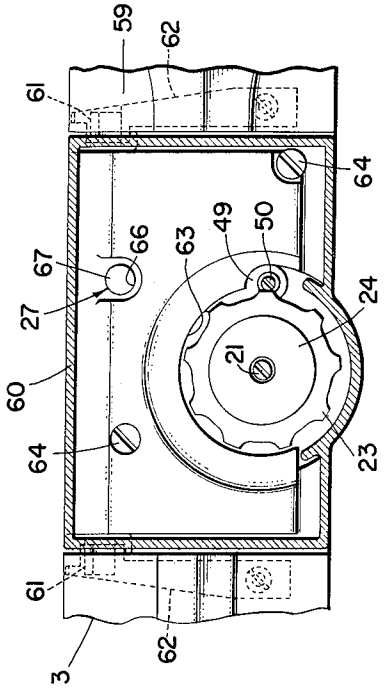


Fig. 6.

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BRACKET-ARM DESIGN FOR ZIGZAG SEWING MACHINES

Filed Jan. 25, 1960 5 Sheets-Sheet 5

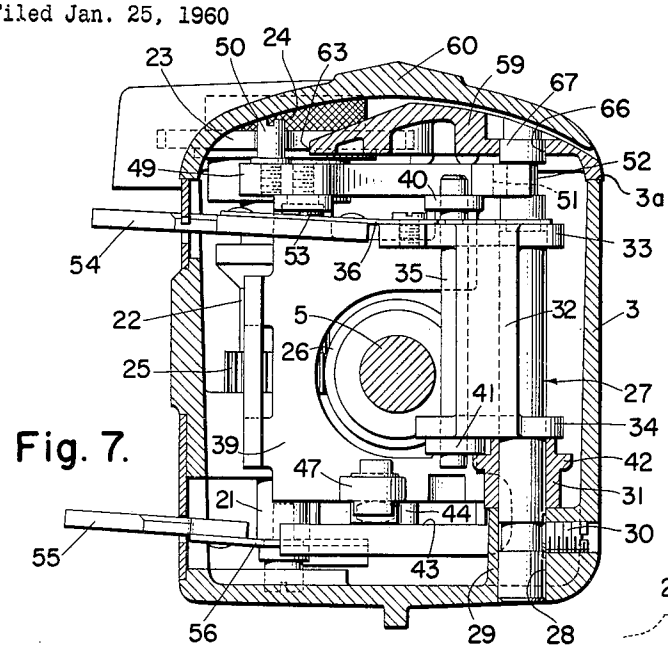


Fig. 7.

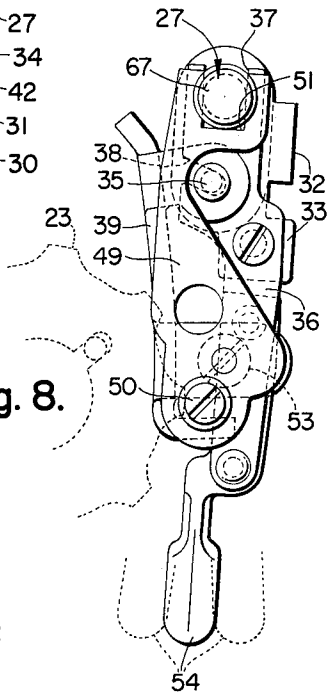


Fig. 8.

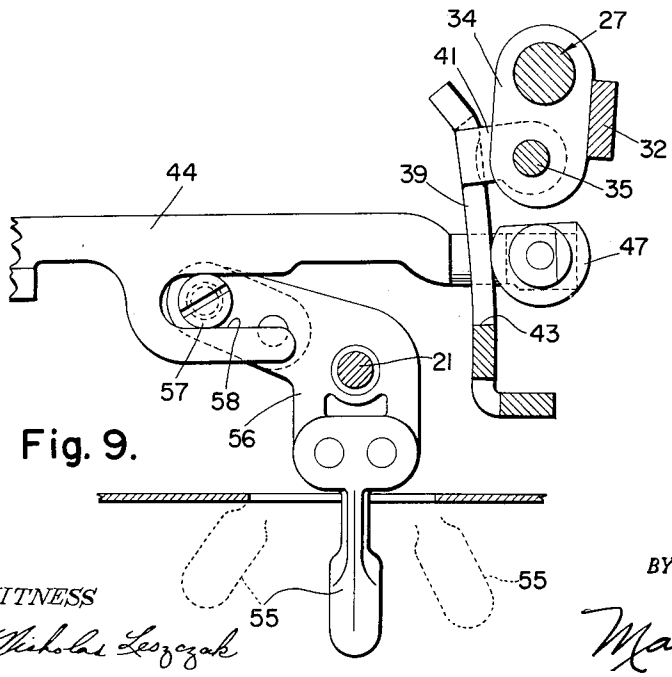


Fig. 9.

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United States Patent Office 3,027,857 Patented Apr. 3, 1962

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BRACKET-ARM DESIGN FOR ZIGZAG SEWING MACHINES

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Filed Jan. 25, 1960, Ser. No. 4,334
3 Claims. (Cl. 112—258)

The present invention relates to sewing machines and particularly to zigzag or ornamental stitch sewing machines.

The object of this invention is to provide an improved means for mounting the zigzag actuation mechanism of a zigzag sewing machine, which means is simple, economical and effective and which will provide for convenient assembly of zigzag actuating mechanism on the stud.

In accordance with the present invention, the above object has been attained by the use of the frame construction whereby the top cover plate of the machine functions as a support for a stud on which is mounted various elements of the zigzag mechanism of the machine. Thus, simply with the top cover plate of the machine removed, the mechanism can be conveniently assembled on the stud and by mounting the top cover plate, it is rigidly supported. At the same time, by the provision of an improved mounting means for the top cover plate, it can be quickly and accurately positioned and is thereafter secured by means that provides a maximum support for the stud while also improving the appearance of the machine and reducing manufacturing costs.

Having in mind the above and other objects that will be evident from an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiment of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it when read in conjunction with the accompanying drawings in which:

FIG. 1 is a front elevational view of a sewing machine embodying the present invention,

FIG. 2 is a vertical sectional view taken longitudinally of the sewing machine of FIG. 1,

FIG. 3 is a vertical transverse sectional view taken substantially on the line 3—3 of FIG. 2,

FIG. 4 is a top plan view of the bracket arm of the sewing machine of FIG. 1 with the cover plate removed,

FIG. 5 is a detail sectional view taken substantially on the line 5—5 of FIG. 2,

FIG. 6 is a fragmentary top plan view of the bracket arm of the sewing machine of FIG. 1 with the hinged plate in section,

FIG. 7 is a vertical transverse sectional view taken substantially on the line 7—7 of FIG. 4,

FIG. 8 is a detail view illustrating the cam follower mechanism in top plan,

FIG. 9 is a fragmentary detail view partially in top plan and partially in section of the amplitude adjustment of the zigzag mechanism.

The present invention is illustrated as embodied in the sewing machine forming the subject matter of the copending United States patent application of Johnson et al., Serial No. 4,430, filed January 25, 1960, wherein the sewing machine is fully disclosed and to which reference may be had for a complete understanding of the machine.

With reference to the drawings, there is illustrated a sewing machine having a frame consisting of a bed 1, a standard 2 rising from one end of the bed and carrying a bracket arm 3 terminating in a head 4 overhanging the bed 1. Journaled longitudinally of the bracket arm 3 is a main shaft 5 having a hand wheel 6 on the end thereof. Power is delivered to the main shaft 5 by an electric motor 7 mounted in the standard 2 and connected by a belt 8 to the hand wheel 6.

A needle bar gate 9 is journaled in the head 4 on a pivot rod 10 for swinging about a vertical axis, the pivot rod 10 being mounted in bosses 11 in the front of the head 4. Slidably mounted for endwise reciprocation in the needle bar gate 9 is a needle bar 12 having a needle 13 secured to the lower end thereof by a needle clamp 14. The upper surface of the bed 1 is formed by a bed plate 15 which, directly below the needle 13, is provided with a throat plate 16. The upper surface of the bed plate 15 and throat plate 16 constitute the work supporting surface of the machine. Upon endwise reciprocation of the needle 13, it is adapted to penetrate the work supporting surface of the machine and to cooperate with an oscillatory hook 17 in the bed 1 in the formation of lock stitches. Endwise reciprocation is imparted to the needle bar 12 by a crank 18 on the head end of the main shaft 5 that is connected by a link 19 to a collar 20 on the needle bar 12.

Mounted in the bracket arm 3 is a vertically arranged stud 21 on which is journaled a tubular cam shaft 22 on the upper end of which is mounted an ornamental stitch pattern cam 23 releasably clamped thereon by a screw 24. The cam shaft 22 has a worm wheel 25 that meshes with a worm 26 on the main shaft 5 for imparting rotation to the cam shaft 22 upon rotation of the main shaft 5.

A second stud 27 is secured at its lower end in a bore 28 in a boss 29 in the bottom of the bracket arm by a set screw 30 and extends from the boss 29 to define a free end. Mounted on the stud 27 is a sleeve 31 and a bracket 32 resting on the sleeve 31 and having upper and lower ears 33 and 34 in which is slidably mounted a pivot pin 35. A locking plate 36 lays flat on the top of the upper ear 33 of the bracket and has a slot 37 in the end thereof cooperating with a peripheral groove in the stud 27 to hold the bracket 32 on the stud 27 and a slot 38 in the side thereof cooperating with a peripheral groove in the pivot pin 35 to hold the pivot pin 35 against endwise movement. An oscillating element in the form of a U-shaped plate 39 is formed with upper and lower ears 40 and 41 for pivotally mounting the same on the pivot pin 35. For positioning the plate 39 vertically, there is provided a flange 42 on the sleeve 31 upon which the lower ear 41 rests. A slot 43 is formed in the lower edge of the plate 39 and receives one end of a pitman 44, the other end of which is pivotally connected by a bracket 45 and pin 46 to the needle bar gate 9. On the side of the plate 39 opposite from the needle bar gate 9, there is a block 47 on the pitman 44 which is adapted to engage the plate 39. The mechanism is biased to move the pitman 44 endwise in the direction to cause the block 47 to engage against the plate 39 by a torsion spring 48 coiled about the pivot rod 10. A cam follower 49 at one end has a follower element 50 that tracks the peripheral pattern surface of the cam 23 and at the other end has a slot 51 that slidably receives a reduced portion 52 of the stud 27 for slidingly pivoting the cam follower 49 on the stud 27. The cam follower 49 is pivotally connected to the plate 39 at an intermediate point by a pivot screw 53. Center or field adjustment of the stitch pattern is provided by a handle 54 connected to the locking plate 36 and thus to the bracket 32 so that upon moving the handle 53, the bracket 32 is pivoted to change the position of the pivot pin 35 on which the plate 39 is pivotally mounted. Amplitude adjustment of the stitch pattern is provided by a handle 55 on a bell-crank lever 56 pivotally mounted intermediate its ends on the bottom of the stud 21 and

having a pin 57 slidably mounted in a slot 58 the pitman 44 to move the pitman along the slot 43 when the handle 55 is moved.

In operation, the follower element 50 is held against the peripheral cam surface of the cam 23 by the spring 48 acting on the needle bar gate 9, pitman 44, plate 39 and cam follower 49. Upon rotation of the cam 23, those portions of the cam surface presenting an increasing radius, forces the cam follower and thus the needle bar gate 9 in one direction while the portions presenting a decreasing radius permit the spring 48 to move the needle bar gate 9 in the other direction.

The bracket arm 3 has an opening or more particularly on open top 3*a* which is normally closed by a top cover plate 59 having a hinged plate 60 pivotally mounted thereon for swinging upwardly about a horizontal axis at the back of the top cover plate 59. The top cover plate 59 overhangs the cam 23 and stud 27. The pivotal mounting for the hinged plate 60 comprises lateral lugs 61 on the hinged plate 60 that are seated in the ends of leaf springs 62 secured to the underside of the plate 59. The springs 62 bias the lugs against the underside of the top cover plate 59 which at the point of contact are formed with V-shaped recesses FIG. 5 to establish an overcenter condition for holding the hinged plate in its open and closed position. The top cover plate 59 is formed with a cut-out 63 to provide for removal of the cam 23 from the cam shaft 22 when the hinged cover 60 is open.

The top cover plate 59 is secured to the top of the bracket arm 3 by two screws 64 threaded into holes 65 in the top of the bracket arm 3. The screws 64 are located beneath the hinged plate 60 so that, for appearance, they are covered when the hinged cover 60 is closed. The cover plate 59 is also formed with a bore 66 that is accurately dimensioned and located to receive the free end 67 of the stud 27. To positon the cover plate initially at assembly, there is formed therein at the end adjacent to the head 4 a pair of spaced depending lugs 68, FIGS. 2 and 4, that define a groove therebetween for receiving the head of a screw 69 carried by a horizontal wall 70 integral with the frame of the machine and thereby locating the cover plate laterally of the bracket arm 3 while permitting movement thereof endwise of the bracket arm relatively to the stud 27 and also removal of the cover plate from the bracket arm. The screw 69 and the end 67 of the stud 27 accurately locate the cover plate 59 on the bracket arm 3 and the holes for the fastening screws 64 are made sufficiently loose to accommodate manufacturing errors. When the screws 64 are tightened, they then secure the cover plate 59 and it in turn serves to support the end 67 of the stud 27. The screws 64 are located closely adjacent to the stud 27 and are spaced both endwise and transversely of the bracket arm 3 to fasten the cover plate securely and to provide maximum support for the stud 27. In this manner, the stud 27 is supported by means which do not interfere with assembly of the elements of the zigzag mechanism on the stud 27. At the same time, the top cover plate 59 presents a relatively flat surface in the area under the hinged plate 60, thus facilitating die casting of the apertures in the top cover plate for receiving the screws 64.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of my invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

Having thus described the nature of the invention, what I claim herein is:

1. In a zigzag sewing machine comprising a frame having an opening, a zigzag mechanism including a stud secured in said frame and having a free end projecting toward said opening, zigzag actuating mechanism mounted on said stud, a cover plate for closing said opening, said cover plate having a hole receiving and supporting the free end of said stud, means for positioning said cover plate laterally on said frame at a point remote from said stud and providing for endwise movement of said cover plate relatively to said stud and for removal of said cover plate from said frame, and releasable means for securing said cover plate on said frame.

2. In a zigzag sewing machine comprising a frame including a bracket arm having an opening, a zigzag mechanism including a stud secured in said bracket arm and having a free end projecting toward said opening, zigzag actuating mechanism mounted on said stud, a cover plate for closing said opening, said cover plate having a hole receiving and supporting the free end of said stud, means for positioning said cover plate laterally on said bracket arm at a point removed from said stud and providing for endwise movement of said cover plate relatively to said stud and for removal of said cover plate from said bracket arm, and releasable means disposed adjacent to said stud for securing said cover plate on said frame.

3. In a zigzag sewing machine comprising a frame including a bracket arm having an open top, a zigzag mechanism including a stud secured in said bracket arm and having a free upper end projecting toward said open top, an oscillating zigzag actuating element pivotally mounted on said stud, a rotary cam shaft journaled in said bracket arm, a switch pattern cam releasably secured on the upper end of said cam shaft, means operatively connecting said cam and said oscillating zigzag actuating element, a cover plate for closing the open top of said bracket arm, said cover plate having a hole receiving and supporting the free end of said stud and a cut-away providing access to said cam for removing and replacing the same, a hinged plate pivotally mounted on said cover plate above said cam and said stud, means for positioning said cover plate laterally on said bracket arm at a point remote from said stud and providing for endwise movement of said cover plate relatively to said stud and for removal of said cover plate from said bracket arm, and releasable means disposed adjacent to said stud and beneath said hinged plate for securing said cover plate in said frame.

References Cited in the file of this patent

Necchi: German application Serial No. N 12,158, Printed October 31, 1956 (Kl. 52a 9).