Sept. 29, 1942. G. STEVENSON 2,297,372

COMBINED SEAMING AND AUXILIARY MECHANISM

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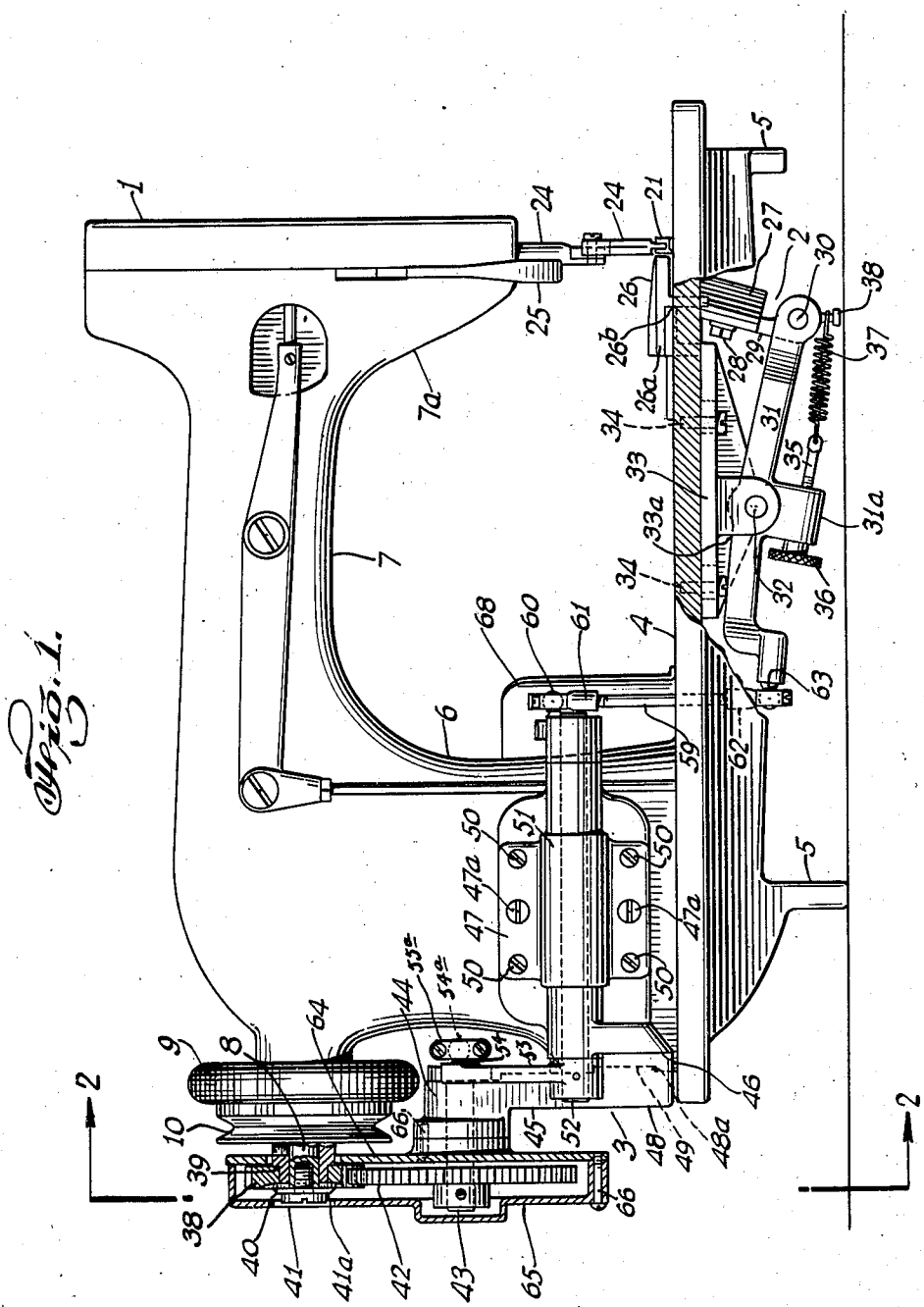


Fig. 1.

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Fig. 2.

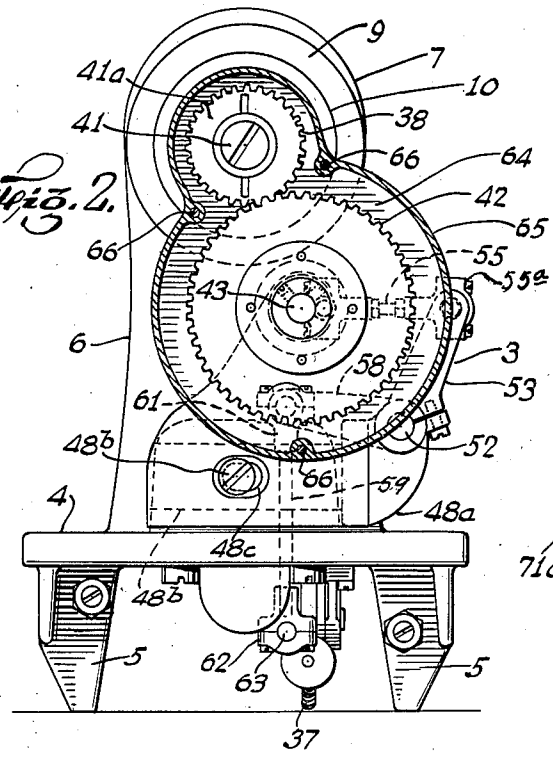


Fig. 7.

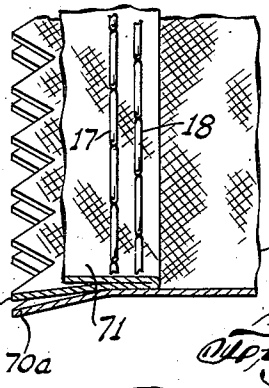


Fig. 8.

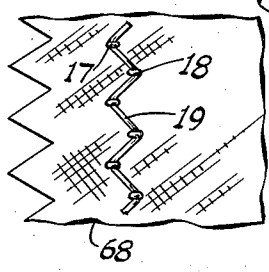
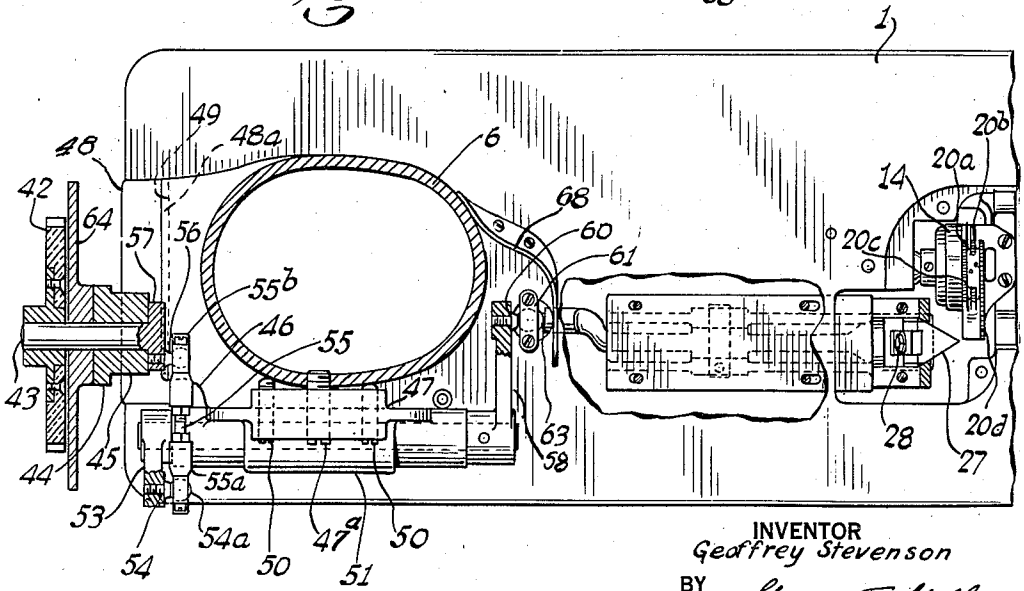


Fig. 6.



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Fig. 4.

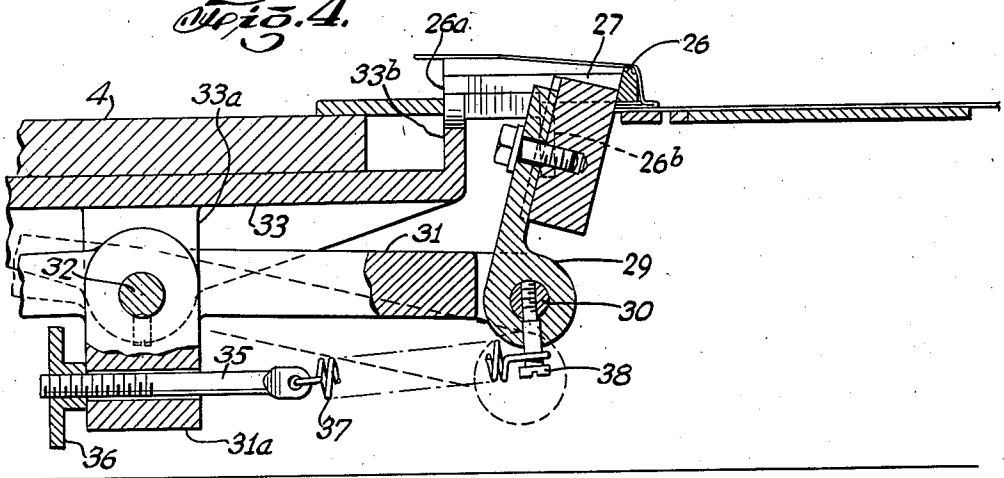


Fig. 9.

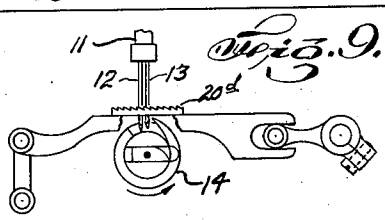


Fig. 3.

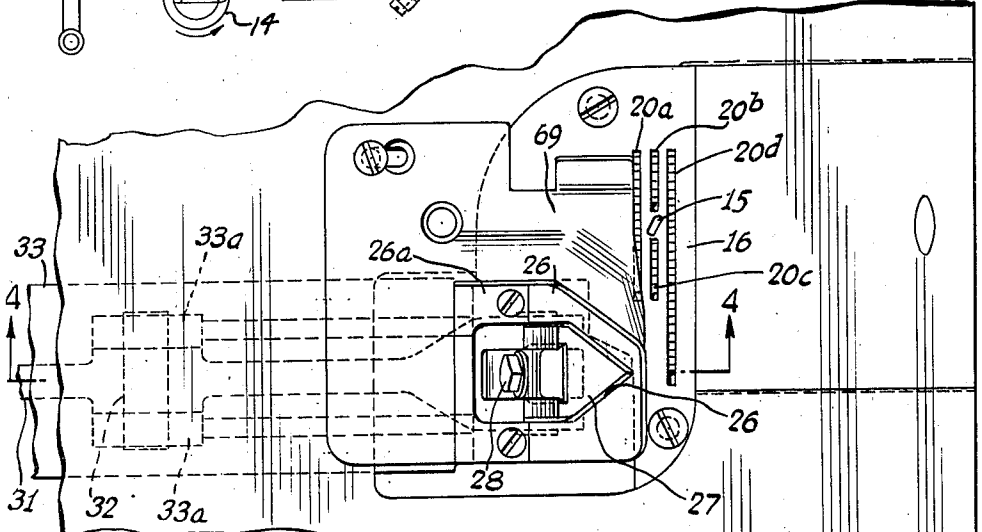
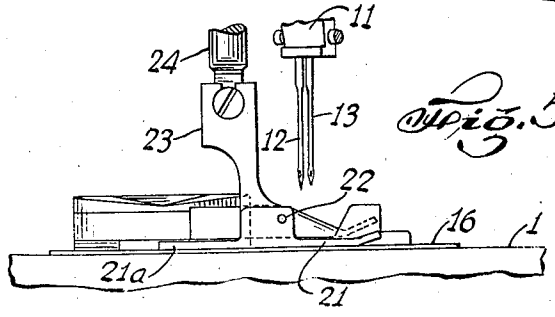


Fig. 5.



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UNITED STATES PATENT OFFICE

2,297,372

COMBINED SEAMING AND AUXILIARY MECHANISM

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Application May 26, 1939, Serial No. 275,854

5 Claims. (Cl. 112—122)

The invention herein disclosed relates to a combined seaming mechanism, an auxiliary mechanism and a drive mechanism for operating the auxiliary mechanism in timed relation with the stitch-forming mechanism of the seaming mechanism, and comprehends a combined seaming and pinking mechanism.

In a combined sewing machine and auxiliary mechanism, such, for example, as a pinking mechanism, that is operated in time relation with the stitch-forming mechanism of the sewing machine, it is desirable to have the auxiliary mechanism driven from the main shaft of the sewing machine. In this way the auxiliary mechanism may be actuated in timed relation with the stitch-forming mechanism without any undue strain on the operative parts of the sewing machine. Likewise, the drive mechanism should be such that there is no obstruction to work passing through the machine.

To provide a combined sewing machine, auxiliary mechanism and drive mechanism for the auxiliary mechanism such that the auxiliary mechanism is driven from the main shaft of the sewing machine; such that the work support of the machine is left clear of obstruction; such that the connecting drive mechanism does not interfere with any operations performed on the sewing machine; such that the arm of the machine is not weakened; and such that there is no operating mechanism between the arm of the machine and the work support are objects of this invention. Another object of the invention is to provide a combined sewing machine and auxiliary mechanism that is comparatively simple of construction. A further object of the invention is to arrange a pinking mechanism with respect to the needle of the stitch-forming mechanism such that it does not interfere with or require a change in the stitch-forming mechanism of the common sewing machine. Another object of the invention is to combine a particular stitch-forming mechanism and pinking mechanism.

The invention will be more clearly understood from the following description of the machine illustrated in the drawings which constitutes an embodiment of the invention and in the construction of which there is realized the foregoing objects and certain advantages that will hereinafter appear.

In the drawings:

Fig. 1 is a rear elevation of the machine, partly broken away;

Fig. 2 is a sectional end elevation of the same; taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary plan of the base or work support of the machine;

Fig. 4 is an enlarged fragmentary sectional elevation taken on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary end elevation of part of the stitch-forming mechanism;

Fig. 6 is a fragmentary plan with the upper arm broken away;

Fig. 7 is a plan of some of the work performed on the machine;

Fig. 8 is a plan of the reverse side of the same piece of work; and

Fig. 9 is a fragmentary section showing the relation of the needles.

In general, the machine illustrated in the drawings (Fig. 1) includes a sewing machine designated generally by the numeral 1; an auxiliary mechanism designated by the numeral 2; and a drive mechanism designated by the numeral 3. The mechanism of the sewing machine except for certain parts, is not illustrated in detail as it may be of well-known construction. Such mechanism merely functions to effect the operation of the stitch-forming mechanism. The specific auxiliary mechanism illustrated is a pinking device which when actuated in timed relation with the stitch-forming mechanism of the sewing machine effects a serrated or pinked edge on the work passing through the machine by effecting the removal of successive, spaced, V-shaped pieces of material. The drive mechanism serves to effect the operation of the pinking mechanism in timed relation with the stitch-forming mechanism by connecting the pinking mechanism for operation from the main shaft of the sewing machine.

The illustration in Fig. 1 is termed a rear elevation as the elevation is taken on that side of the machine that is away from the operator and to the rear in relation to the direction of movement of work through the machine. The sewing machine comprises a frame that includes a base or work support 4 having integral supporting legs or studs 5; a vertical standard 6 that extends from the base adjacent one end thereof, the left end as viewed from the rear of the machine; and an arm 7 extending from the upper end of the standard and parallel to the base. The main shaft 8 of the sewing machine is journaled in the arm 7 and extends through the arm at the standard. A combined hand wheel 9 and grooved pulley 10 is mounted on the extended end of the shaft 8. Through the pulley the shaft is driven in the usual way by a belt (not shown). Among other things the main shaft drives, in a manner

and by mechanism well known in the art, a reciprocating needle bar 11 (Figs. 5 and 9) slidably mounted in the enlarged free end 7a (Fig. 1) of the arm 7.

The stitch-forming mechanism of the sewing machine includes two needles 12 and 13 (Figs. 5 and 9) carried by the needle bar; the feed mechanism for feeding the work through the machine; and a single rotary loop taker or hook 14 (Figs. 6 and 9) that services both needles; and the usual take-up mechanism. The needles extend from the lower end of the needle bar and are separately threaded when the machine is in operation. Upon the downward stroke of the needle bar, the two needles pass through a slot 15 (Fig. 3) in the needle plate 16 and extend below the base. In the downward position of the needles, the ends thereof are adjacent the loop taker, the hook of which takes the loops from both needles and so services both needles, the loop taker being of the type used on the well-known "Singer" or "Wilcox and Gibbs" single needle, lock-stitch machine. The stitch produced with a hook and bobbin of the type commonly used to service the needle of a single needle lock-stitch machine, is illustrated in Figs. 7 and 8. As seen in Fig. 7, the stitch is formed of three threads, two needle threads 17 and 18 threaded through the needles 12 and 13 respectively and a thread 19. By the action of the needles, loops of the threads 17 and 18 are passed through the material abreast and spaced apart laterally the distance of the points of the needles. These loops are entered by the mass supply of the bobbin thread 19. These operations are repeated to form a sequence of stitches. The needles are offset at an angle (the angle of the slot 15 in the needle plate) such that the penetration of one is slightly behind the other; and the rear needle, relative to the direction of the feed, is set slightly deeper than the forward needle as illustrated in Fig. 9. This arrangement brings the stitches close together and forms an elastic stitch.

The feed mechanism includes (Figs. 3 and 6) four serrated feed dogs 20a, 20b, 20c, and 20d. The feed dogs 20b and 20c are ahead and behind respectively the slot 15 in the needle plate; the feed dog 20a is at one side, the left as seen in Fig. 3 of the slot and is of a length to extend between the opposite ends of the feed dogs 20b and 20c; and the feed dog 20d is approximately one and one half times as long as the feed dog 20a and is located on the opposite side of the slot in the needle plate. These feed dogs are actuated to feed the cloth through the machine by the usual four motion feed mechanism well known in the art, the feeding action taking place when the needle bar 11, is raised. The feed dogs act against a resiliently mounted presser foot 21. The presser foot (Fig. 5) is pivotally mounted as at 22 on an arm 23 that is secured to the presser foot bar 24. This presser foot bar is raised and lowered (Fig. 1) to relieve and clamp the cloth against the needle plate in the usual and common manner by a manually operated lever 25. The presser foot 21 is shaped to overlie the several feed dogs described above having a narrow rearwardly extending section 21a to overlie the rearwardly extending portion of the feed dog 20d. Also, this presser foot has a slot therethrough of the same shape and size as the slot 15 in the needle plate 16 with which it is aligned. The purpose of this extended feed dog and presser foot will hereinafter more fully appear.

The function of the elongated feed dog 20d and the rearward extension 21a of the presser foot is to effect a positive feed of the cloth through the auxiliary or pinking mechanism, the effective or cutting parts of which are arranged behind the needle relative to the direction of movement of cloth through the machine. This pinking mechanism includes two relatively movable co-acting members in pressure contact. For the purpose of clearly describing the invention a particular kind of pinking mechanism has been illustrated. The particular arrangement illustrated is two knives in pressure contact arranged to effect the removal of successive, spaced, V-shaped pieces of material and similar to that illustrated in my co-pending application Serial No. 142,696 filed May 14, 1937, which has resulted in Patent 2,165,312. The two knives (Figs. 1, 3 and 4) consist of a V-shaped, stationary female knife 26 and a movable male knife 27. The female knife is mounted in a frame 26a slightly above but in a plane parallel to the base 4 of the sewing machine. The knife has depending lugs 26b that engage the male knife in its lower or withdrawn position i. e. fully withdrawn from the female knife, and positions it to enter the female knife on its upward stroke. The male knife 27 is mounted below the base of the machine. This latter knife is secured by means of a machine bolt 28 to a lever 29 that is pivotally secured at 30 between the arms of a lever 31, bifurcated at the end thereof.

The lever 31 constitutes a part of the operating mechanism of the pinking device. It is pivoted (Figs. 1 and 4) intermediate its ends on a pivot 32 extending between the arms 33a of a bracket 33. The bracket 33 is secured to the underside of the base of the frame of the sewing machine by machine screws 34. This bracket has an offset extension 33b that extends up through the base 4 of the machine and supports the frame 26a for the female knife 26 which frame is formed as a part of the bracket. At the point at which the lever 31 is pivoted on the pivot 32 it has a lateral lug 31a formed thereon through which a hole is bored. In this bore, there is slidably mounted a threaded stud 35. A knurled nut 36 is threaded on one end of this stud and forms an abutment which engages the side of the lug 31a. One end of a spring 37 is connected to the opposite end of the stud and the other end of the spring is connected to a stud 38 secured to the lever 29. This spring exerts a resilient force on the male knife 27 and holds it in resilient engagement, in pressure contact, with the cutting edge of the female knife 26. The knurled nut 36 forms an adjustment for varying the force exerted by the spring 37. It will be apparent that as the lever 31 is oscillated about the pivot 32 the knife 27 will be reciprocated relative to the knife 26 and the knives being held in yieldable pressure engagement by the spring 37 will effect the removal of successive, spaced, V-shaped pieces of cloth.

The lever 31 is oscillated in timed relation with the reciprocations of the needle bar through the drive mechanism 3 which transmits motion from the main shaft 8 of the sewing machine to the lever 31. This drive mechanism (Figs. 1, 2 and 6) includes a gear 38 mounted on the extended end of the main shaft 8 of the sewing machine and on the outside of the pulley 10. The extended end of the shaft is reduced in diameter forming a shoulder 39 (Fig. 1) against which one face of the gear 38 abuts. The gear 38 is caused to

rotate with the main shaft by a key 40 fitting into aligned keyways in the reduced portion of the shaft and the gear. A machine screw 41 having an enlarged head 41a is threaded into a tapped hole in the end of the shaft 8 and holds the gear 38 in place on the shaft.

The gear 38 meshes with a gear 42 mounted on a shaft 43. This shaft is journaled in a bearing 44 formed on an arm 45 of a bracket 46. The bracket 46 includes a plate 47 secured by machine screws 47a to the rear of the vertical standard 6 of the sewing machine frame; a lateral arm 48 that extends along the side of the standard; and the arm 45. The arm 48 has a longitudinal tongue 48a that is received in a complementary, milled slot 49 in the side of the standard. A machine screw 48b (Fig. 2) passing through a slot 48c in the arm 48 and threaded into a tapped hole in the standard 6 holds the tongue and groove in engagement. This tongue and groove arrangement and the machine screws 47a maintain the bracket 46 securedly fixed on the frame of the sewing machine. Threaded through tapped holes in the plate 47 there are four adjusting screws 50 (Figs. 1 and 6) which bear against the vertical standard. By means of these adjusting screws the bracket may be adjusted to secure the proper alignment of the several parts entering into the motion transmitting train forming the drive mechanism. The adjusting screws bearing against the curved surface of the vertical standard also assist in maintaining the rigidity of the assembly.

On the plate 47 there is formed a bearing bracket 51 (Figs. 1 and 6) in which there is journaled a jack shaft 52 (Figs. 1, 2 and 6). On the end of the jack shaft adjacent the gear 42, there is secured a lever 53. Secured in the free end of the lever 53, there is a fitting 54 having a ball 54a formed on the end thereof. This ball is received in a socket formed in a fitting 55a on the end of an adjustable connecting rod 55. A similar socket in a fitting 55b on the other end of the connecting rod 55 receives a ball on the end of a fitting 56 secured in a crank 57 formed on the end of the shaft 43.

From the foregoing it will be seen that rotation of the main shaft 8 effects, through the gears 38 and 42, rotation of the shaft 43 and the crank 57. Through the connecting rod 55, lever 53, rotation of the crank 57 is transformed into oscillatory movement of the jack shaft 52. Oscillation of the jack shaft results in oscillation of the lever 31 and thus reciprocation of the knife 27 through a lever 58 and a connecting rod 59 (Figs. 1, 2 and 6). The lever 58 is secured at one end to the end of the shaft 52 for movement therewith. On the other end of this lever, there is secured a ball fitting 60 that is received in a socket fitting 61 screwed on the threaded end of the connecting rod 59. The connecting rod 59 extends through the base 4 of the sewing machine and on the end thereof below the base of the sewing machine there is another socket fitting 62. A ball fitting 63, secured in the offset end of the lever 31 is received in the socket fitting 62. Thus, oscillation of the jack shaft is transmitted to and effects oscillation of the lever 31 about the pivot 32.

The gears 38 and 42 are enclosed in a housing formed in part by a plate 64 secured to the the bearing 44 and a cover 65 (Fig. 1). The plate 64 is secured to the end face of the bearing 44 by the machine screws 66 and has openings therethrough for the shafts 8 and 43. Machine screws 67 secure the cover 65 to the plate 64. The portion of the connecting rod 59 above the base of the machine and the lever 58 are partially encased by a guard 68. This guard acts to prevent the work passing through the machine from coming into contact with the connecting rod 59. A guide 69 (Fig. 3) is provided to direct the edges of the cloth sewn together through the pinking device and the upper layer of the cloth over the element 26.

The positioning of the pinking knives behind the needle relative to the direction of feed of the cloth through the machine simplifies the construction of the combined seaming and pinking mechanism. With this construction, it is not necessary to reconstruct or change the position of any of the parts of a standard sewing machine. The elongated feed dog 20d assures a positive feed of the cloth through the pinking elements as well as past the needles.

In Figs. 7 and 8, there is illustrated a sample of the work performed on the machine illustrated in the drawings. The stitch-forming mechanism sews two pieces of cloth 70 and 71 with double, parallel stitches as previously described. The edges 70a and 71a of the two pieces of cloth, during the sewing operation pass between the female knife and the base of the machine while the body of the piece of cloth 71 passes over the knives. During the feeding operation, the male knife 27 is below the base of the machine. While the cloth is stationary the needle bar moves downwardly to penetrate the cloth and the male knife 27 moves upwardly and in co-operation with the knife 26 effects the removal of V-shaped pieces of material at the edges of the two pieces of cloth. The gear 38 and 42 have a ratio of three to one so that the knife 27 is reciprocated only one third as many times as the needle bar, but this ratio may be varied to suit any particular condition. The effect of the co-operation of the knives 26 and 27 is a pinked or serrated edge, 70a and 71a, on the pieces of cloth adjacent to which the stitches are formed.

It will be observed that while the drive mechanism 3 connects the pinking mechanism to be driven by the main shaft 8 of the sewing machine, the space between the arm 7 of the frame of the machine and the base 4 is clear of mechanism and the drive mechanism is so arranged as neither to interfere with the operator nor to interfere with any of the operations performed on the sewing machine. Likewise, the arrangement is such that a minimum of machine work is required to fit the drive and pinking mechanism to the sewing machine. It is also to be noted that the drive mechanism does not interfere with the removal of the belt from the pulley 10.

It will be obvious that various changes may be made by those skilled in the art in the details of the embodiment of the invention disclosed in the drawings and described above within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In a combined seaming and pinking mechanism, the combination comprising a sewing machine including a frame having a base, a main shaft journaled in the frame, stitch-forming mechanism including a needle driven by the main shaft, and means for feeding cloth past the stitch-forming mechanism; and pinking mechanism driven by the main shaft including a pair

of cooperating, relatively movable, pinking elements coacting with each other mounted to the rear of the needle relative to the direction of feed and disposed to effect cutting in a plane substantially parallel to the plane of the base of the frame, operating mechanism mounted below the base of the frame for effecting relative movement of the co-acting elements, and means operatively connecting said operating mechanism to be driven by the main shaft of the sewing machine.

2. In a combined seaming and pinking mechanism, the combination comprising a sewing machine including a frame having a base, a main shaft journaled in the frame, stitch-forming mechanism including a needle driven by the main shaft, and means for feeding cloth past the stitch-forming mechanism; and pinking mechanism driven by the main shaft including a pair of co-operating, relatively movable yieldably engaging pinking knives having co-acting cutting edges mounted to the rear of the needle relative to the direction of feed and disposed to effect cutting in a plane substantially parallel to the plane of the base of the frame, operating mechanism mounted below the base of the frame, for effecting relative movement of the knives transverse to the cutting plane of the knives, and means operatively connecting said knife operating mechanism to be driven by the main shaft of the sewing machine.

3. In a combined seaming and auxiliary mechanism, the combination comprising a sewing machine including a frame having a base, a vertical standard and an arm extending from the standard parallel to the base, a main shaft journaled in the arm and extending through the arm at the standard, and stitch-forming mechanism driven by the main shaft; an auxiliary mechanism operable in timed relation with the stitch-forming mechanism; and a drive mechanism for said auxiliary mechanism including a bearing mounted on the rear of the standard, a jack-shaft journaled in the bearing, a gear mounted on the extended end of the main shaft, another gear meshing therewith, a crank connecting said second mentioned gear and one end of the jack-shaft, a connecting rod extending through the base of the machine and connected to actuate said auxiliary mechanism, and a crank connecting said connecting rod and said jack-shaft.

4. In a combined seaming and pinking mechanism, the combination comprising a sewing machine including a frame having a base, a main shaft journaled in the frame, stitch-forming mechanism including a needle driven by the main shaft, and means for feeding cloth past the stitch-forming mechanism, and pinking mechanism including a pair of cooperating, relatively movable, pinking elements coacting with each other mounted to the rear of the needle relative to the direction of feed and disposed to effect cutting in a plane substantially parallel to the plane of the base of the frame, operating mechanism mounted below the base of the frame for effecting relative movement of the coacting elements, and means operatively connecting said operating mechanism to effect relative movement of the coacting elements in timed relation with respect to the needle.

5. In a combined seaming and auxiliary mechanism, the combination comprising a sewing machine including a frame having a base, a vertical standard and an arm extending from the standard, a main shaft journaled in the arm and extending through the arm at the standard and stitch-forming mechanism driven by the main shaft; an auxiliary mechanism mounted below the base of the sewing machine and operable in timed relation with the stitch-forming mechanism; and a drive mechanism mounted on the frame and connecting the auxiliary mechanism for operation by the main shaft of the sewing machine including a drive element mounted on the extending end of the main shaft, the drive mechanism being arranged to leave the space between the arm and the base of the machine clear.

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