

Feb. 5, 1935.

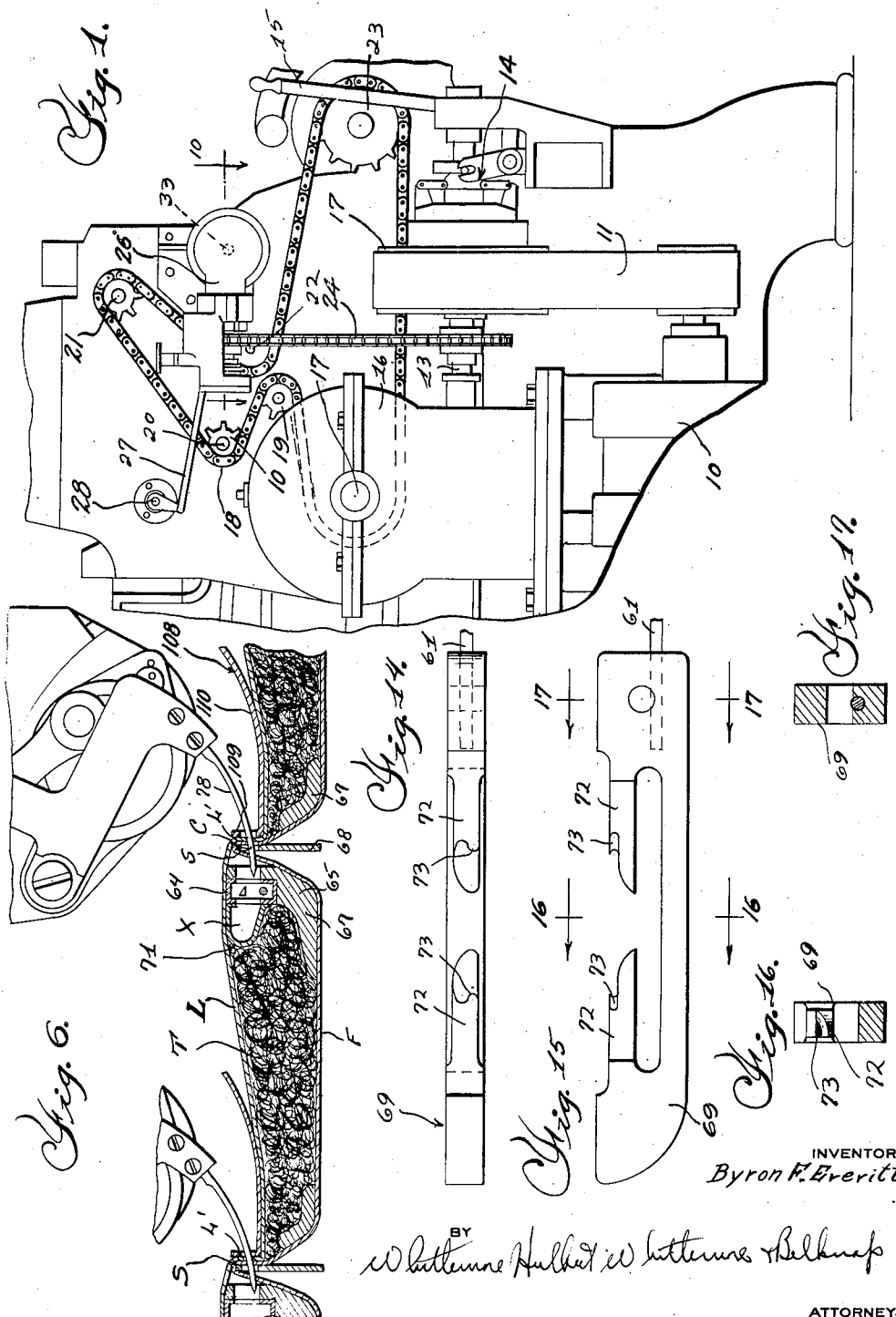
B. F. EVERITT

1,989,919

SEWING MECHANISM

Filed Jan. 5, 1931

9 Sheets-Sheet 1



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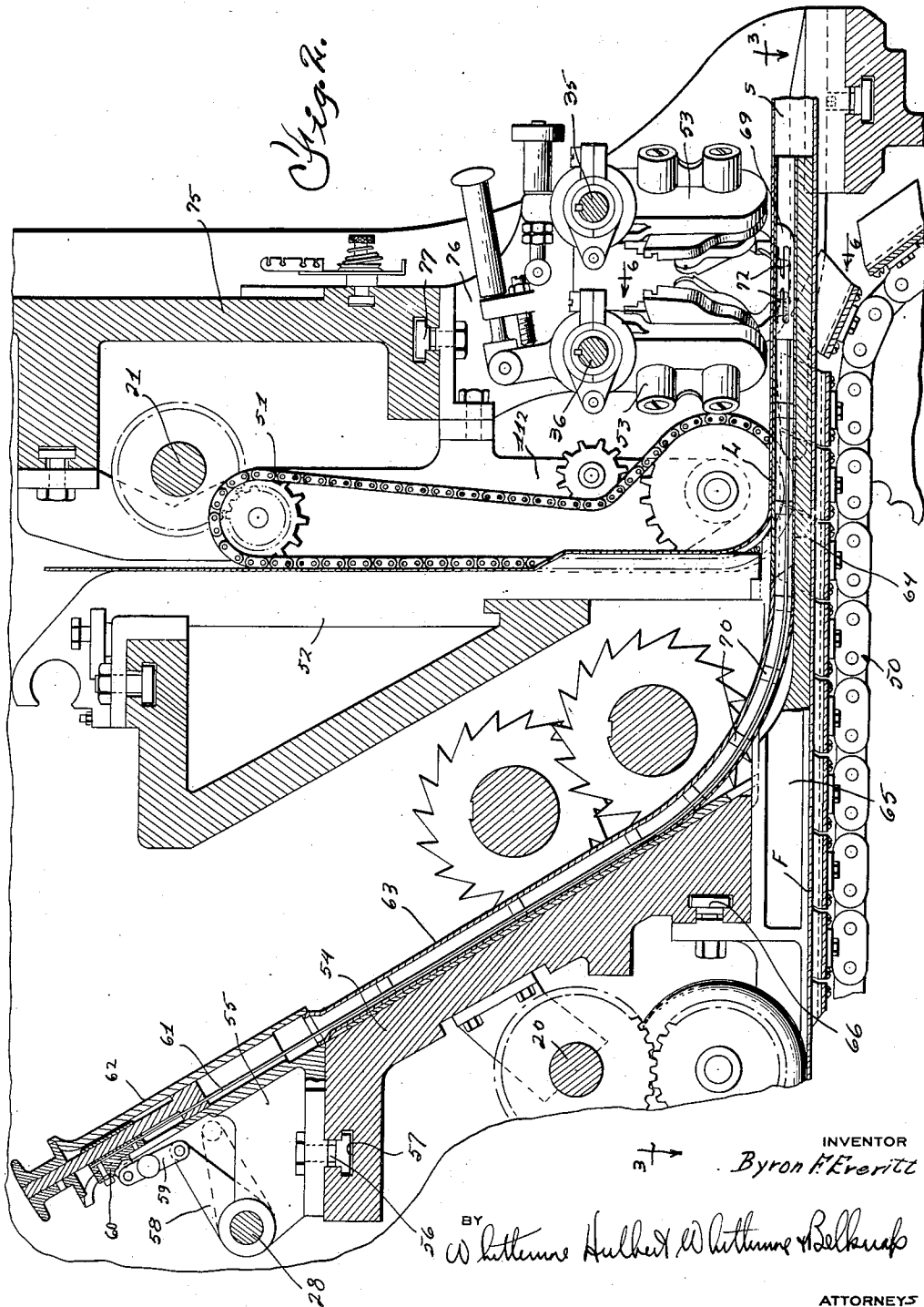
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SEWING MECHANISM

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Feb. 5, 1935.

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SEWING MECHANISM

Filed Jan. 5, 1931

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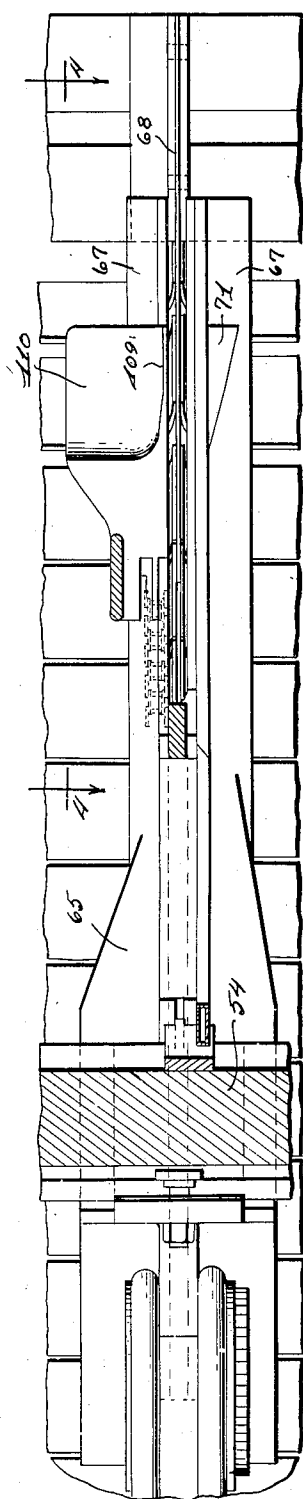


Fig. 3.

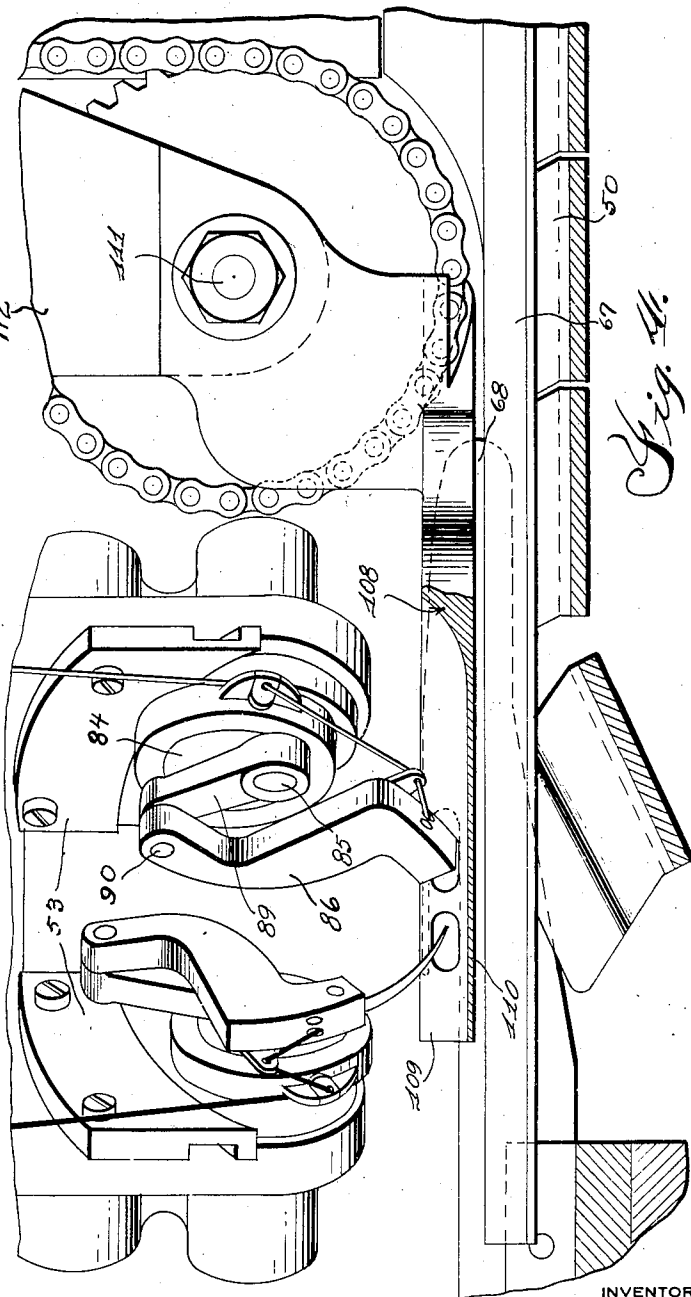


Fig. 4.

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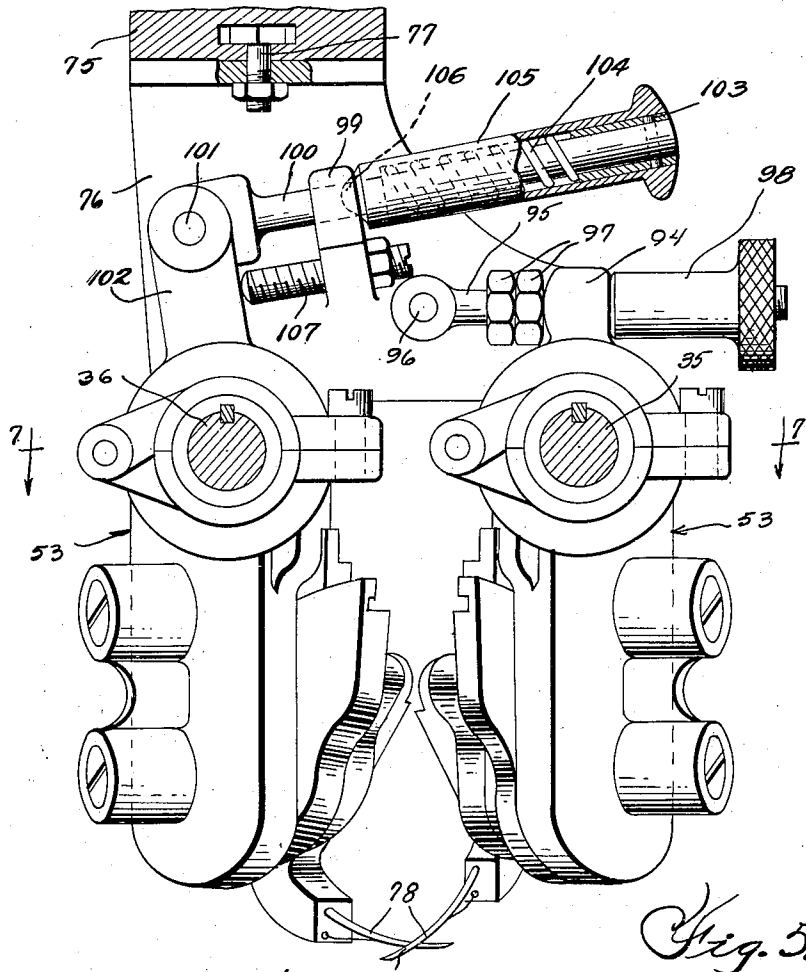


Fig. 5.

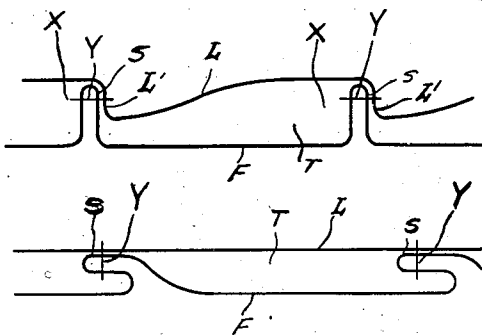


Fig. 33.

Fig. 34.

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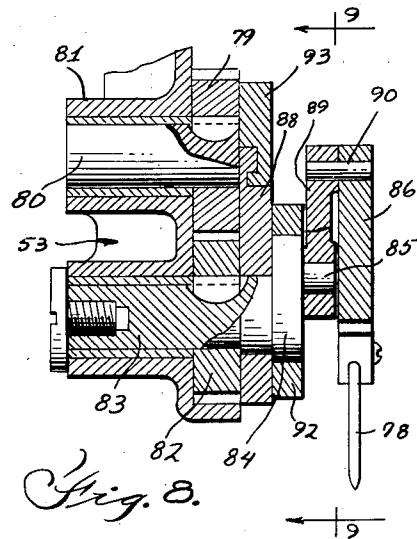
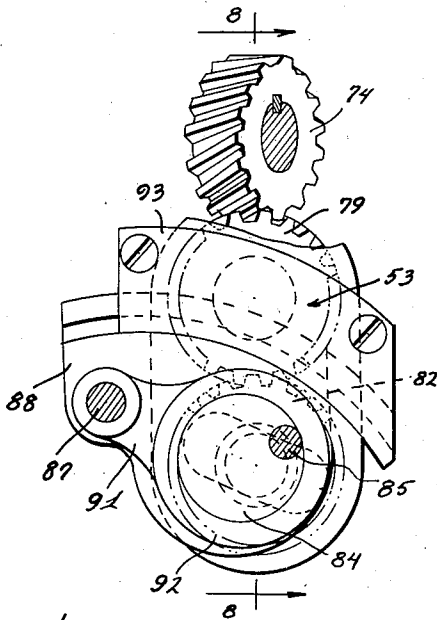
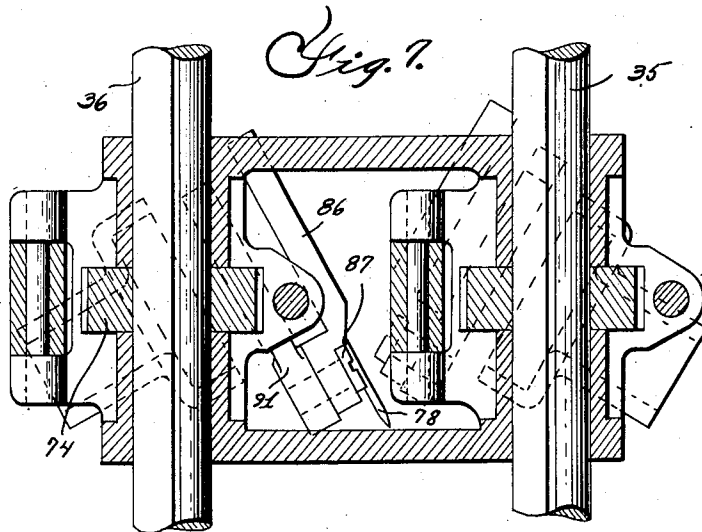
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SEWING MECHANISM

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9 Sheets-Sheet 5



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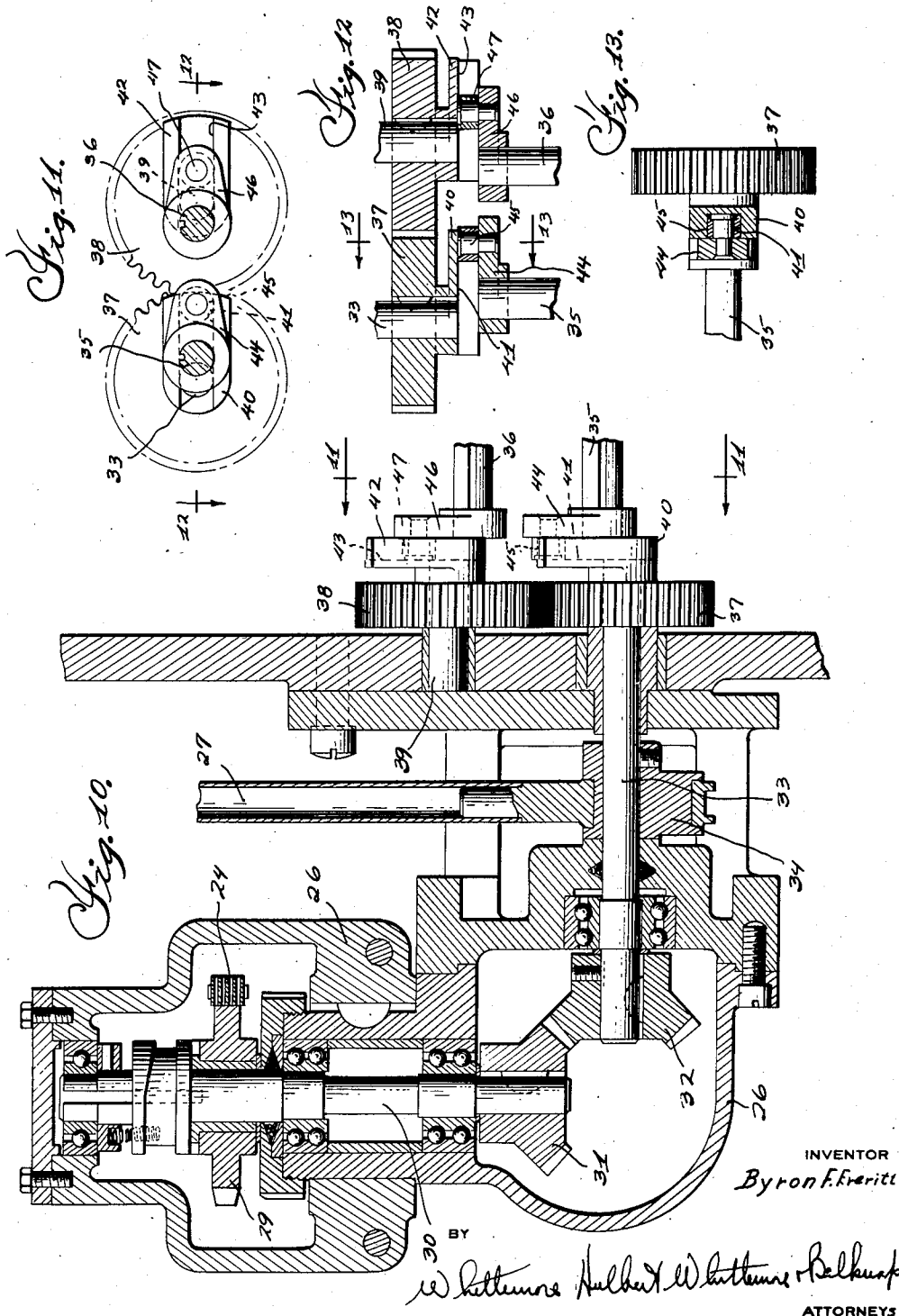
B. F. EVERITT

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SEWING MECHANISM

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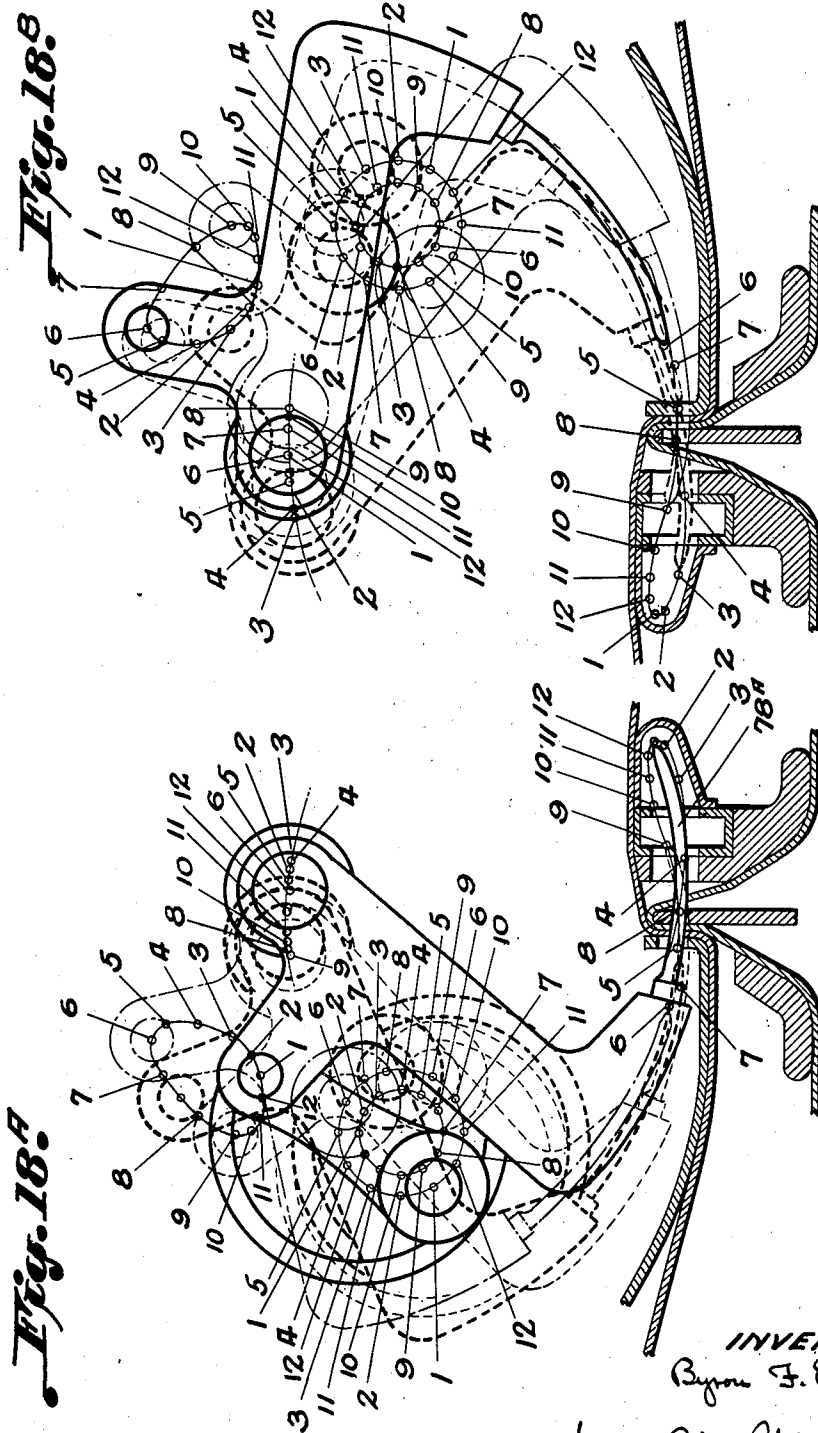
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SEWING MECHANISM

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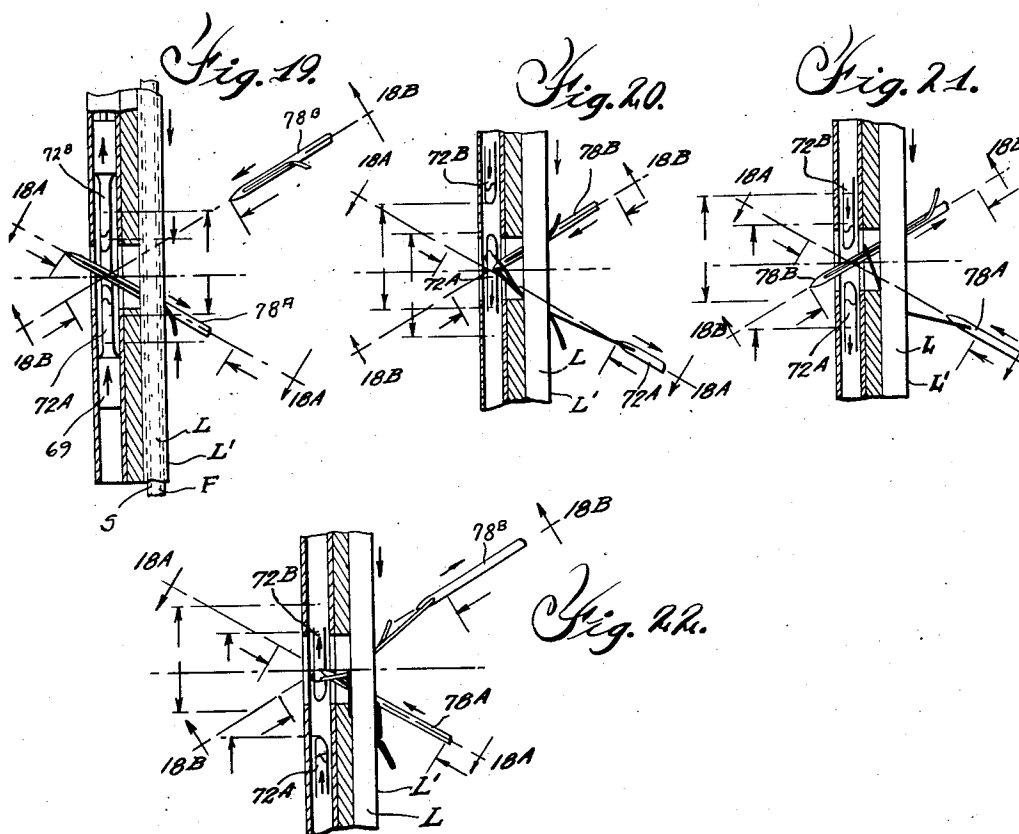
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SEWING MECHANISM

Filed Jan. 5, 1931

9 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

1,989,919

SEWING MECHANISM

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mesne assignments, to Briggs Manufacturing
Company, Detroit, Mich., a corporation of
Michigan

Application January 5, 1931, Serial No. 506,791

16 Claims. (Cl. 112-2)

This invention relates to a sewing mechanism and method, and more particularly to a method of and apparatus for manufacturing upholstery for seat cushions and the like. Structurally, the invention has particular reference to an improved sewing mechanism employing a pair of threaded thrusting and retracting needles and a double reciprocating looper.

One of the important objects of this invention is to provide a sewing mechanism in which the needles have a differential movement during their thrusting and retracting movement so as to decrease the increment of time during which the needle is engaged with the seam ridge. Co-operating with the needles of the sewing mechanism is a double reciprocating looper having portions which take the loop from each needle and preserve or hold the loop for engagement by the other needle upon its thrusting movement.

As in the companion cases previously mentioned, the instant invention contemplates stitches extending from the exterior of the tubes or tubular upholstery into the interior of the tubes where the stitches are completed. To this end the thrusting and retracting needles are arranged exteriorly of the tubes and are thrust through the seam ridges into the interior of the tubes where the looper works, the looper cooperating therewith to complete the stitches inside the tube.

The several objects, advantages and novel details of construction of this invention together with the manner in which the method is practiced will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein

Figure 1 is a sectional side elevational view of a sewing apparatus constructed in accordance with this invention;

Figure 2 is an enlarged fragmentary vertical longitudinal sectional view showing the means for presenting the finish and lining fabrics to the sewing mechanism together with the position and location of the sewing mechanism with respect thereto;

Figure 3 is a detail horizontal fragmentary sectional view taken substantially on the plane indicated by line 3-3 in Figure 2 looking in the direction of the arrows;

Figure 4 is an enlarged vertical fragmentary sectional view taken substantially on the plane indicated by line 4-4 in Figure 3;

Figure 5 is an enlarged sectional elevational view of one of the sewing heads;

Figure 6 is an enlarged fragmentary sectional elevational view taken substantially on the plane indicated by line 6-6 in Figure 2 showing the relation of one of the needles of the sewing head to the seam ridge;

Figure 7 is a sectional elevational view taken substantially on the plane indicated by line 7-7 in Figure 5 looking in the direction of the arrows;

Figure 8 is a fragmentary vertical sectional view through one of the sewing heads taken substantially on the plane indicated by line 8-8 in Figure 9;

Figure 9 is a sectional view taken substantially on the plane indicated by line 9-9 in Figure 8;

Figure 10 is an enlarged fragmentary horizontal sectional view taken substantially on the plane indicated by line 10-10 in Figure 1;

Figure 11 is a sectional elevational view taken substantially on the plane indicated by line 11-11 in Figure 10;

Figure 12 is a horizontal sectional elevational view taken substantially on the plane indicated by line 12-12 in Figure 11;

Figure 13 is a detail sectional elevational view taken substantially on the plane indicated by line 13-13 in Figure 12;

Figure 14 is an enlarged top plan view of the looper;

Figure 15 is an enlarged side elevational view of the looper;

Figure 16 is a sectional view taken substantially on the plane indicated by line 16-16 in Figure 15;

Figure 17 is a sectional view taken substantially on the plane indicated by line 17-17 in Figure 15;

Figures 18a and 18b are semi-diagrammatic elevational views respectively of the two sewing heads of the sewing mechanism as seen respectively on the lines 18a-18a and 18b-18b looking in the direction of the arrows in Figures 19, 20, 21 and 22 respectively;

Figure 19 is a semi-diagrammatic sectional elevational view showing the relative positions of the needles and looper as they are shown in heavy black lines in Figures 18a and 18b;

Figure 20 is a similar view showing the needles and looper in the light line positions illustrated in Figures 18a and 18b;

Figure 21 is a similar view showing the positions of the needles and looper in the heavy dot and dash line positions shown in Figures 18a and 18b;

Figure 22 is a similar view showing the positions of the needles and looper in the light dot

and dash line positions shown in Figures 18a and 18b;

Figures 23 to 30 inclusive are semi-diagrammatic views illustrating the sewing operations;

5 Figure 31 is a view showing the completed stitch as it appears on one side of the seam ridge;

Figure 32 is a similar view showing the stitch as it appears on the reverse side of the seam ridge;

10 Figure 33 is a diagrammatic view illustrating the manner in which the finish and lining fabrics are presented to the sewing mechanism, and

Figure 34 is a diagrammatic view of the completed upholstery with the lining fabric stretched 15 taut.

Referring now particularly to the drawings and more especially to Figures 33 and 34, the general problem involved herein will be explained. In these figures the reference character F indicates 20 the finish fabric or velour and the reference character L indicates the lining fabric or base material. In accordance with this invention the finish and lining fabrics are united to provide a plurality of plaits or tubes with the stitching extending from outside the lining fabric into the 25 interior of the tubes where the stitching is completed. Therefore, in accordance with this invention the finish fabric is gathered to provide a plurality of spaced seam ridges S and the lining fabric is arranged in superposed relation over 30 the finish fabric with portions L' thereof adjacent to and parallel with the seam ridges S at one side thereof. The lining fabric is spaced from the seam ridges at the other side thereof to provide for the completion of the stitch within the 35 tube T. The finish and lining fabrics are united by transverse stitching Y extending from the outside through the portions L' of the lining fabric L and through the seam ridges S of the finish 40 fabric F, the needles extending into the space X where they cooperate with the loopers to complete the stitches. When the upholstery is subsequently applied to the seat the lining fabric L is stretched taut as shown in Figure 34, but inasmuch as no 45 seam ridge has been gathered in the lining fabric no strain is imparted to the stitching Y. Moreover, the stitching is substantially invisible upon the face of the completed upholstery. In this respect the finished upholstery is substantially the 50 same as that constructed by the heretofore known manual methods of manufacture.

In Figure 1 of the drawings the drive mechanism will be explained. In this figure there is illustrated a motor 10 which drives a belt 11 55 which passes around a pulley 12 mounted on a shaft 13. The pulley 12 may be coupled to the shaft 13 by a clutch mechanism 14 actuated by a handle 15. The shaft 13 extends into a reduction gearing housing 16 and extending from this 60 housing and driven at a reduced speed is a main shaft 17. A chain 18 passes around a sprocket on the main shaft 17, thence around an idler 19 and around a sprocket on the shaft 20 which drives the cloth forming mechanism. From here 65 the chain passes around a sprocket on the foundation forming mechanism shaft 21. From here the chain passes around a sprocket on the cotton bat feeding mechanism shaft 22 and thence around a sprocket on shaft 23 which drives the 70 front roll and then back around the sprocket on the main shaft 17. A chain 24 is driven from the shaft 13 and drives the sewing mechanism drive shaft 33 through gearing contained in the housing 26 and yet to be referred to more in detail. 75 The gearing contained in the housing 26 is con-

nected by means of a rod 27 to the looper operating shaft 28.

In Figure 10 the gearing for actuating the sewing mechanism and contained in the housing 26 is shown in detail and somewhat enlarged. 5 The chain 24 passes around a sprocket wheel 29 mounted on a shaft 30 journaled in suitable bearings in the housing 26, this shaft being provided with a miter gear 31 meshing with a companion 10 miter gear 32 on a drive shaft 33, the latter also being mounted in suitable bearings in the housing 26. Keyed to shaft 33 is an eccentric 34 with which the end of the rod 27 which actuates the looper shaft, is connected. Thus the looper shaft 15 is oscillated in timed relation with the sewing mechanism for purposes which will appear more fully hereinafter.

Extending transversely of the machine are a pair of spaced parallel companion sewing head 20 shafts 35 and 36 each of which drives one of the companion sewing heads of each sewing mechanism which as will be obvious comprises a pair of sewing heads. The companion shafts 35 and 36 are driven through crank mechanisms which provide for differential or variable speed of each 25 shaft. That is, the shaft is rotated during a portion of each rotation at a relatively rapid rate and during the remainder of each rotation at a relatively slow rate.

For this purpose the shaft 33 has keyed thereto 30 a pinion 37 which meshes with a pinion 38 keyed to stub shaft 39 mounted on a suitable stationary part of the machine. Thus, these shafts 33 and 39 rotate in unison. The end of shaft 33 has keyed thereto a crank 40 provided with an axial 35 or longitudinal slot 41 and shaft 39 has keyed thereto a crank 42 provided with a similar axial or longitudinal slot 43. The shafts 35 and 36 are mounted eccentrically with respect to shafts 33 and 39 respectively and shaft 35 is provided with 40 a crank 44 provided with a pin or roller 45 which works in slot 41 of crank 40. Shaft 36 is provided with a crank 46 provided with a roller or pin 47 which works in slot 43 in crank 42.

With this mechanism each of the shafts 35 and 45 36 is driven through a pair of eccentrically arranged cranks, slidably interconnected. Therefore, when, for instance, shaft 33 is rotated crank 40 is consequently rotated and during its rotative movement it imparts a rotative movement to the 50 corresponding sewing head shaft 35 through the slidable connection 41-45. However, owing to the eccentric relation of shafts 33 and 35, shaft 35 is rotated at a variable speed, its rotation being relatively rapid when the roller 45 is in the 55 outer end of slot 41 and relatively slower when this roller is in the other end of slot 41, or in other words closer or adjacent the axis of rotation of shaft 33. The same or corresponding rotative movement is imparted to shaft 36 but owing 60 to the reversal of the relation of the parts the shaft 36 is rotated rapidly while shaft 35 is being rotated slowly and vice versa.

By reference to Figure 2 it will be noted that there is fragmentarily illustrated a main con- 65 veyor 50 which forms spaced parallel seam ridges in the finish fabric and presents the same to the sewing mechanism. The structure of this main conveyor is illustrated more in detail in copending application Serial No. 462,620. The reference 70 characters 51 and 52 indicate cooperating lining or foundation forming members which form the portions L' in the lining fabric and present this lining fabric in superposed relation with the finish fabric to the sewing mechanism. The con- 75

struction and operation of this foundation forming mechanism is illustrated and described in copending application, Serial No. 590,275.

As will be observed in Figure 2, the sewing head shafts 35 and 36 extend transversely of the machine and drive the sewing heads 53 arranged in pairs and mounted on the shafts in spaced longitudinal relation transversely of the machine. The construction and operation of each sewing head, which will be referred to more in detail hereinafter, is substantially the same as the sewing heads illustrated and described in copending application, Serial No. 400,317. In the former case each sewing mechanism comprises a pair of cooperating sewing heads and in the latter case each sewing mechanism comprises a single sewing head and a cooperating looper. In the present construction each sewing mechanism comprises a pair of sewing heads arranged so that the needles thereof work in vertical planes which intersect one another at an angle and a double looper reciprocating on a horizontal path in a vertical plane which is intersected by the vertical plane in which each of the needles works.

The reference character 54 indicates a transverse frame member to which a plurality of bracket members 55, one for each looper mechanism, are mounted for adjustment transversely of the machine. For this purpose each bracket member may be provided with a bolt 56 having a T-shaped head which works in a T-shaped slot formed in the frame member 54. These brackets 55 support the looper shaft 28 previously referred to and for each looper there is keyed to this shaft 28 a link or arm 58 which is detachably connected by means 59 to a reciprocating head 60 which actuates a flexible looper actuating member or shaft 61. This head 60 reciprocates in a housing 62 carried by the bracket 55 and the flexible shaft 61 extends through a looper housing section 63 detachably mounted and a companion looper housing section 64 fixed to a member 65 which is adjustably connected as at 66 for transverse adjustment to the frame member 54. The members 65 is provided with bifurcations constituting forming shoes or members 67 which cooperate with a sewing plate 68 to hold the finish material F in a position to present the seam ridges to the sewing mechanism, see particularly Figure 6.

When the detachable connection 59 between the arm 58 and the head 60 is disengaged, the head 60 together with the flexible looper shaft 61, the looper 69 and the spaced guides 70 may be withdrawn longitudinally from within the housing sections 63 and 64. Thus the looper may be repaired or replaced with facility.

As will be most apparent from Figure 6, the looper housing section 64 in which the looper 69 reciprocates is mounted upon the shoe member 67 and extends within the tube or plait T formed by the finish and lining fabrics F and L. The space X previously referred to is provided by means of a tapered guard 71 fixed to one side of the looper housing 64.

By reference to Figures 14 to 17 inclusive the structure of the looper 69 will be more apparent. It will be noted that the looper is shaped to provide a pair of opposed looper points 72 each of which is provided with a hook portion 73. The looper is of such a cross-section at the opposite ends thereof as to fit within the looper housing section 64 for reciprocation therein, the looper being reciprocated as will be obvious, by means of the flexible shaft 61 which is connected there-

to at one end thereof as shown most clearly in Figures 14 and 15.

By reference to Figures 4, 6, 7, 8 and 9, the construction and arrangement of the parts of the pair of sewing heads of each sewing mechanism will be more apparent. Inasmuch as the construction of the sewing heads has been fully described in several of the aforesaid copending applications, the construction thereof will be but briefly touched upon herein.

For each of the sewing heads 53 mounted on each of the shafts 35 and 36, these shafts are provided with, respectively, driving pinions 74. Each pinion 74 is keyed to its respective shaft so as to rotate therewith but is capable of longitudinal movement thereon. Each pair of sewing heads 53 is adjustably mounted and supported by a transverse frame member 75 by means of brackets 76 adjustably connected thereto by means 77. The pair of sewing heads 53 of each sewing mechanism are arranged at an angle to one another so that the needles 78 thereof work in vertical planes which intersect one another at a substantially acute angle. Means is provided for imparting to each needle a thrusting and retracting movement and a rocking movement so that the needle will be thrust through the seam ridge and rocked to spread the loop carried thereby and withdrawn, the latter being in its retracting movement.

By particular reference to Figures 7, 8 and 9 it will be noted that each of the sewing heads is driven by one of the aforesaid pinions 74 which meshes with an idler pinion 79 on a stub shaft 80 journaled in the frame 81 of the sewing head. This pinion meshes with a pinion 82 on a stub shaft 83 also mounted on this frame 81. The pinion 82 is keyed to the shaft 83 and this shaft carries on one of its ends an eccentric crank disk 84 provided with a crank pin 85. The needle arm 86 is pivotally mounted as at 90 on a sector shaped slide 88 and the needle arm 86 is rocked about its pivot 90 by means of a needle arm actuating link or crank 89 pivotally connected to the crank pin 85 and pivotally connected to the needle arm 86 as at 90. Thus upon rotation of the eccentric crank disk 84 the needle arm 86 is rocked about its pivot 87 by means of the crank arm 89. This imparts a thrusting and retracting movement to the needle.

The needle is rocked during its thrusting and retracting movement by shifting its pivot 90, this pivot being shifted in an arcuate path, the center of which arc is substantially the point C which point is in the arcuate path of needle 78 and in the central vertical plane of the seam ridge. This shifting of the pivot 87 is accomplished by means of a link 91 which is pivotally connected to the slide 88 through the needle arm pivot 87, this link having a portion 92 which embraces the eccentric periphery of the crank disk 84. Thus upon rotation of the crank disk 84, the link 91 is substantially longitudinally reciprocated and imparts an oscillatory shifting movement to the slide 88. This slide 88 is mounted in a guide 93.

By reference to Figure 5 it will be noted that each of the sewing heads 53 is rockably adjustable about its drive shaft 35 or 36 respectively independently of each other. For instance, the sewing head to the right as viewed in Figure 5 is provided with a pair of upstanding lugs 49 which embrace an adjusting screw 95 which in turn is pivotally connected as at 96 to the bracket 76. Lock nuts 97 threadedly engage the screw 95 and engage the lug 94 at one side thereof, whereas an adjustable sleeve nut 98 is threaded upon the

screw 95 at its free end and engages the lug 94 at the outside thereof. Thus this unit may be adjustably rocked about its shaft 35 as will be obvious. The left hand sewing head as viewed in Figure 5 has means for permitting adjustable rocking movement if desired. To this end the bracket 76 is provided with a bifurcated lug 99 through which rod 100 passes, this rod being pivotally connected as at 101 to an extension 102 formed on the frame of the sewing head 53. The rod 100 carries a head 103 against which one end of a spring 104 engages, the other end engaging an internal shoulder on the sleeve 105. This sleeve has the end 106 thereof shaped to engage a corresponding surface on the lug 99. This construction will permit a rocking movement of the head 53 about its shaft 36 in one direction. In the other direction this is accomplished by a set-screw 107.

From Figure 6 it will be apparent that the seam ridge S which is first formed in the finish fabric F by means of the main conveyor 50 is presented over the sewing plate 68 and by reason of the cooperation of the shoes 67 the seam ridge is maintained as the material progresses toward the sewing mechanism so as to properly present each seam ridge to the sewing mechanism. As was previously pointed out the lining fabric L arranged parallel to the seam ridges S at one side thereof is formed and presented by the mechanism 51—52 previously briefly referred to. However, as the fabrics are presented to the sewing mechanism after leaving the foundation or forming means 51—52, means must be provided for maintaining this relationship of the lining material and for this purpose I provide a guide plate member 108, see Figures 3, 4 and 6, this member having an upstanding flange portion 109 which holds the lining material against and parallel with the seam ridge S at one side thereof and with a base or foot portion 110 which guides the adjacent portion of the lining material. This guide plate member 108, as shown in Figure 4, may be conveniently mounted as at 111 to the support 112.

In operation the needles 78 have each imparted thereto a thrusting and retracting movement, one of the needles partaking of its thrusting movement while the other needle partakes of its retracting movement. The looper 69 reciprocates in a horizontal path in a vertical plane across the path of the needles in timed relation thereto, the purpose of the looper being, as will appear more fully hereinafter, to hold the loop formed by each needle until the other needle completes its thrusting movement to take the loop. It will be understood that each needle first partakes of a thrusting movement and rocks to open its loop whereupon this loop is caught up by one of the looper points 72 and positioned for engagement by the other needle at the end of its thrusting movement, the loop formed by this second needle being held by the other looper point 72 for engagement by the first mentioned needle on its next thrusting movement.

In Figures 18a and 18b each needle is shown in the position it assumes at the end of its retracting movement, at the end of its forward or thrusting movement, and at two intermediate positions, the cycle of needle movement being divided into four increments, and by comparison of Figures 18a and 18b, the relative positions of the pair of needles can be determined at each of these points in the cycle, particularly when considered in connection with Figures 19 to 22,

each of which figures indicates in plan view the relative positions of the two needles and the looper.

As probably most clearly illustrated in Figures 18a and 18b the needle 78 is rocked to cause its point to describe a loop, this rocking movement occurring particularly during the end of the thrusting movement and the beginning of the retracting movement of the needle so that each needle may be thrust forward on an arc, the medial line of which extends over the horizontal plane of the adjacent looper point 72 and then the needle is rocked to dip the point thereof downwardly so that this point is arranged in a horizontal plane below the longitudinal horizontal plane of the looper point. This spreads the loop carried by the needle and permits the looper point 72 to pass through the loop so as to hold this loop for engagement by the other needle. It will be understood that the eccentric crank drive connection for each sewing head shaft 35 is so arranged that the needle 78 is thrust into and through the seam ridge and withdrawn therefrom relatively rapidly, the speed of the needle varying and being somewhat slower during the remainder of the movement of the needle so that the increment of time during which the needle is engaged with the fabrics is reduced.

By comparison of Figures 19 to 23 inclusive it will be noted that needle 78a is at the end of its thrusting position and at this point is being rocked downwardly to spread the loop carried thereby so that the looper point 72a may pass over the needle and engage the loop formed thereby. The needle 78b is commencing its thrusting movement and will take the loop from the looper 72a during the end of the thrusting movement of the needle 78b. This position of the needles is shown in heavy black lines in Figures 18a and 18b.

In Figure 20 the needle 78a is practically at the end of its retracting stroke and the loop is shown as carried by the looper point 72a and is being engaged by the needle 78b which is near the end of its thrusting stroke. The looper is now moving in an opposite direction and assists in freeing the loop and depositing it on the needle 78b. This position of the needles is shown in solid light lines in Figures 18a and 18b.

In Figure 21 the needle 78b has taken the loop from off the looper point 72a and the needle 78b is about at the end of its thrusting movement and is being rocked downwardly to spread the loop carried thereby for engagement by the looper point 72b. The needle 78a is at about the end of its retracting stroke and has again started its thrusting movement. This position of the needles is shown in heavy dot and dash lines in Figures 18a and 18b.

In Figure 22 the looper point 72b is shown as holding the loop which it took from the needle 78b and the needle 78a is shown on its thrusting movement taking the loop from off the looper point 72b, the looper moving back again to assist in transferring this loop from the looper point 72b to the needle 78a. The needle 78b is near the end of its retracting stroke. This position of the needles is shown in light dot and dash lines in Figures 18a and 18b.

The sewing operation will probably be more apparent by a comparison of Figures 23 to 30 inclusive. In these figures the thread carried by the needle 78a is shown in heavy lines and the thread carried by the needle 78b is shown in light lines.

The direction of movement of the needles and looper is indicated by arrows in each figure.

In Figure 23 the needle 78a is at the end of its thrusting stroke and the beginning of its retracting stroke and has been rocked to lower the point below the horizontal plane of the path of movement of the looper point 72a which is partaking of its thrusting movement or in other words, its movement to the left. In Figure 24 the looper point 72a has taken the loop from the needle 78a which is on its retracting stroke and the looper point 72a is partaking of its retracting movement as the needle 78b is taking the loop from off the looper point 72a. In Figure 25 the needle 78b has already completely taken the loop from the looper point 72a and is beginning to partake of its retracting movement and has been rocked to spread its loop so that the looper point 72b may hold the loop of needle 78b.

In Figure 26 the loop of needle 78b is shown as transferred to the looper point 72b and the needle 78a is at the end of its thrusting stroke and is taking the loop from the looper point 72b, the looper point 72b at this stage being retracted to assist in transferring the loop from the point 72b to the needle 78a.

In Figure 27 the loop has been completely transferred from the looper point 72b to the needle 78a and this needle has partaken of a rocking movement to spread its loop so that the looper point 72a may hold the same for engagement by the needle 78b. The needle 78b is shown as taking this loop from the looper point 72a in Figure 28 and as the looper point 72a retracts from the loop to assist in transferring the same to the needle 78b, the needle 78b continues its thrusting movement and simultaneously partakes of a rocking movement, this position of the parts being illustrated in Figure 29.

In this position shown in Figure 29, the looper point 72b is again ready to take and hold the loop which has just been spread by the rocking movement of the needle 78b and in Figure 30 the needle 78a is shown as having already taken the loop off the looper point 72b and as having partaken of its rocking movement to spread its loop which will be taken and held by the looper point 72a for engagement by the needle 78b during the end of its thrusting movement.

The resulting stitch is a double chain stitch shown in Figure 31, the reverse side of the line of stitching being illustrated in Figure 32.

The herein described sewing mechanism provides means for stitching and forming tubular upholstery where the stitches extend from the outside of the tubes to the interior thereof where they are completed, the stitches passing through but a single thickness of the lining or backing material and through a seam ridge in the finish or top fabric. Thus the backing material may be stretched taut without imparting any strain to the stitches, this being customary when the upholstery is applied to the seat or back. The invention contemplates a structure wherein the looper is not threaded but merely reciprocates in a path which intersects the path of travel of the needles, the looper acting to hold the loops formed by each needle for subsequent engagement by the other needle. With such an arrangement the needles may be operated each at a variable speed so that the period during which the needle is being thrust and retracted through the fabrics may be lessened or shortened. This permits of a rapid, smooth and continuous sewing operation at a high

speed which is conducive of efficiency in commercial production.

Obvious modifications, changes and re-arrangements of the parts may suggest themselves to those skilled in this art and to this end reservation is made to make such changes as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. Sewing mechanism including a pair of needles working in longitudinal vertical planes which intersect one another, and a looper working in a longitudinal vertical plane which intersects the working planes of the needles at the point of intersection thereof.

2. Sewing mechanism comprising a pair of needles working in longitudinal vertical planes at an angle to one another, each needle having a thrusting and retracting movement which intersects the working plane of the other needle and a reciprocating looper working in a vertical longitudinal plane which intersects the working planes of the needles at the point of intersection of the needle paths.

3. Sewing mechanism comprising a pair of needles working in longitudinal vertical planes at an angle to one another, each needle having a thrusting and retracting movement and a rocking movement, and a reciprocating looper working in a vertical longitudinal plane which intersects the working planes of the needles.

4. Sewing mechanism comprising a pair of needles working in vertical longitudinal planes at an angle to one another, each needle having a thrusting and retracting movement through a seam, and a rocking movement about a point substantially in the vertical longitudinal plane of the seam, and a reciprocating looper working in a vertical longitudinal plane which intersects the working planes of the needles.

5. Sewing mechanism comprising a pair of needles working in vertical longitudinal planes at an angle to one another, each needle having a thrusting and retracting movement and a rocking movement prior to the thrusting movement of the other needle, and a reciprocating looper working in a vertical longitudinal plane which intersects the working planes of the needles.

6. Sewing mechanism comprising a pair of needles working in paths which angularly intersect one another, said needles respectively partaking simultaneously of thrusting and retracting movements, each needle having a rocking movement at the end of its thrusting movement, and a looper reciprocating in a horizontal path which intersects the paths of movement of said needles.

7. Sewing mechanism comprising a pair of needles working in paths which angularly intersect one another, said needles respectively partaking simultaneously of thrusting and retracting movements, each needle having a rocking movement at the end of its thrusting movement, and a looper reciprocating in a horizontal path which intersects the paths of movement of said needles in a horizontal longitudinal plane between the upper and lower limits of the rocking movement of the needles.

8. Sewing mechanism including a pair of needles each reciprocated in an arcuate path about a center which is shifted on an arc struck from a point in the arcuate path of the needle and a reciprocating looper working in a longitudinal horizontal plane which substantially intersects the normal longitudinal medial line of the arcuate path of the needles.

9. Sewing mechanism comprising a pair of needles

- dles, means for reciprocating each needle to cause the same to axially pass through the same longitudinal horizontal plane in the seam, means for rocking the needles about the point of intersection of said plane with the seam to shift the point thereof from a point above said plane to a point below said plane, and a looper reciprocating in a horizontal plane substantially coincident with the plane of the seam through which said needles pass.
10. Sewing mechanism comprising a pair of needles working in vertical longitudinal planes at an angle to one another, each needle having a variable speed thrusting and retracting movement and a rocking movement, and a looper working in a path which intersects the working paths of the needles at the point of intersection of the needle paths.
11. Sewing mechanism comprising a pair of needles working in vertical longitudinal planes which intersect one another, each needle having a thrusting and retracting movement, a looper reciprocating in a horizontal path which intersects the working paths of the needles, each needle having a rocking movement to lower its point end substantially prior to the commencement of its retracting movement past the point of intersection of the looper.
12. The combination with means for feeding plies of finish and lining fabrics and forming seam ridges in one fabric and arranging the other fabric parallel to the seam ridges at one side thereof, of means for uniting the fabrics comprising a pair of needles having thrusting and retracting movements through the parallel and seam ridge portions of the fabrics into the space therebetween, and a double looper reciprocating within said space cooperating with said needles to complete the stitches within the space between said fabrics.
13. The combination with means for feeding plies of finish and lining fabrics and forming seam ridges in one fabric and arranging the other fabric parallel to the seam ridges at one side thereof, of sewing mechanism for uniting the fabrics including a pair of needles working in angularly intersecting paths, means for imparting a thrusting and retracting movement to each needle to thrust the same through the parallel and seam ridge portions of the fabrics into the space therebetween, and a double pointed looper reciprocating in said space and cooperating with said needles to complete the stitches within the space between said fabrics.
14. The combination with means for feeding plies of finish and lining fabrics and forming seam ridges in one fabric and arranging the other fabric parallel to the seam ridges at one side thereof, of sewing mechanism for uniting the fabrics including a pair of needles working in angularly intersecting paths, means for imparting a thrusting and retracting movement to each needle to thrust the same through the parallel and seam ridge portions of the fabrics into the space therebetween, and a double pointed looper reciprocating within said space and cooperating with said needles to hold the loop of one needle for engagement by the other needle whereby to complete said stitches within the space between said fabrics.
15. The combination with means for gathering finish fabric to form spaced seam ridges and arranging a lining fabric with portions thereof parallel to the seam ridges to form tubes therebetween, of sewing mechanism including a pair of needles, means for thrusting and retracting said needles through the parallel and seam ridge portions of said fabrics in paths which intersect one another within said tubes, and a double pointed looper reciprocating within said tube for alternately holding the loop of each needle for engagement by the other needle.
16. The combination with means for gathering a finish fabric to form spaced seam ridges and arranging a lining fabric with portions thereof parallel to the seam ridges to form tubes therebetween, of sewing mechanism including a pair of needles, means for thrusting and retracting said needles through the parallel and seam ridge portions of said fabrics in paths which intersect one another within said tubes, means for actuating said needles each at a variable speed, and a double pointed looper reciprocating within said tube for alternately holding the loop of each needle for engagement by the other needle.

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