

Jan. 25, 1938.

C. F. RUBEL ET AL

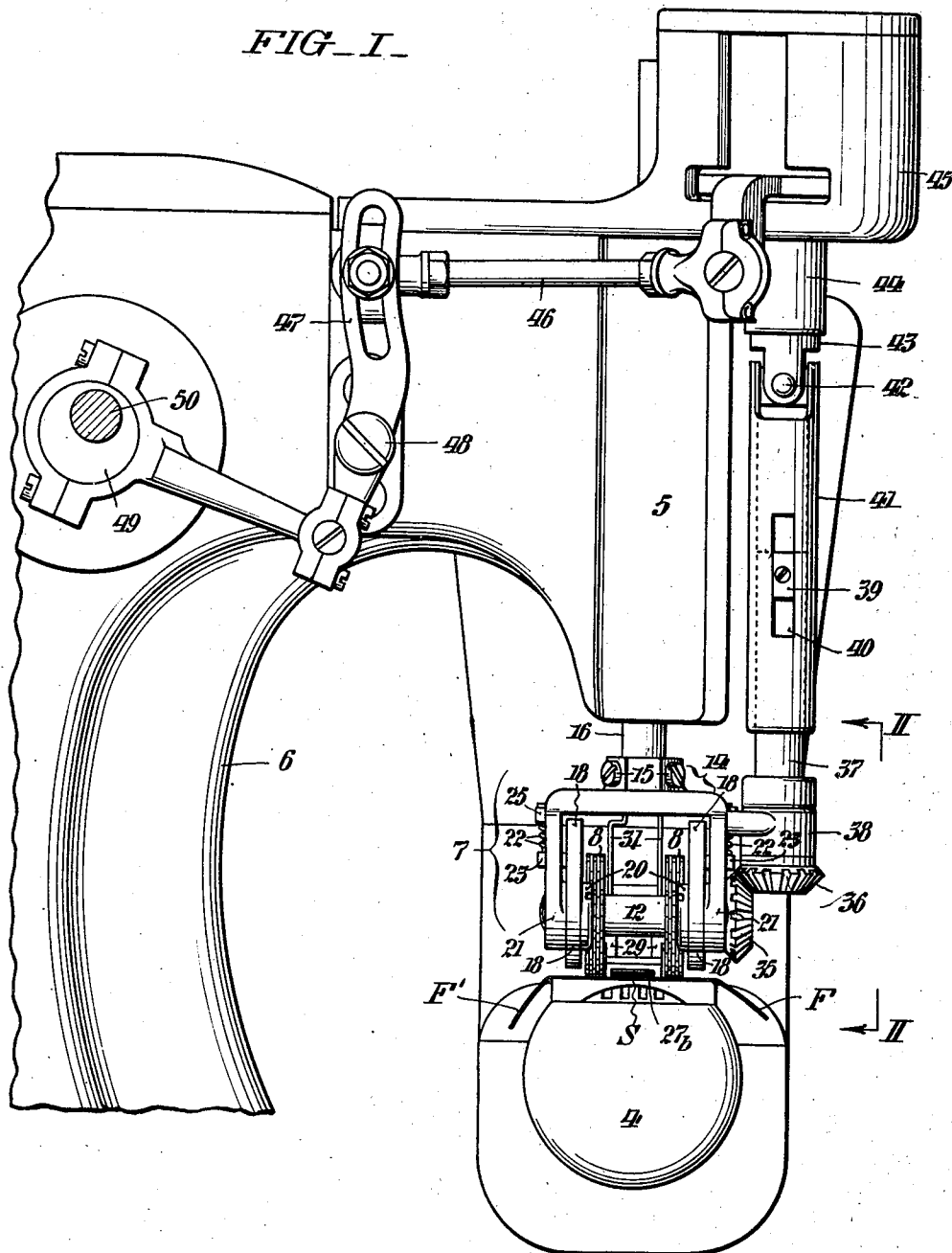
2,106,536

FABRIC FEEDING MECHANISM FOR SEWING MACHINES

Filed June 5, 1935

4 Sheets-Sheet 1

FIG. I.



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4 Sheets-Sheet 2

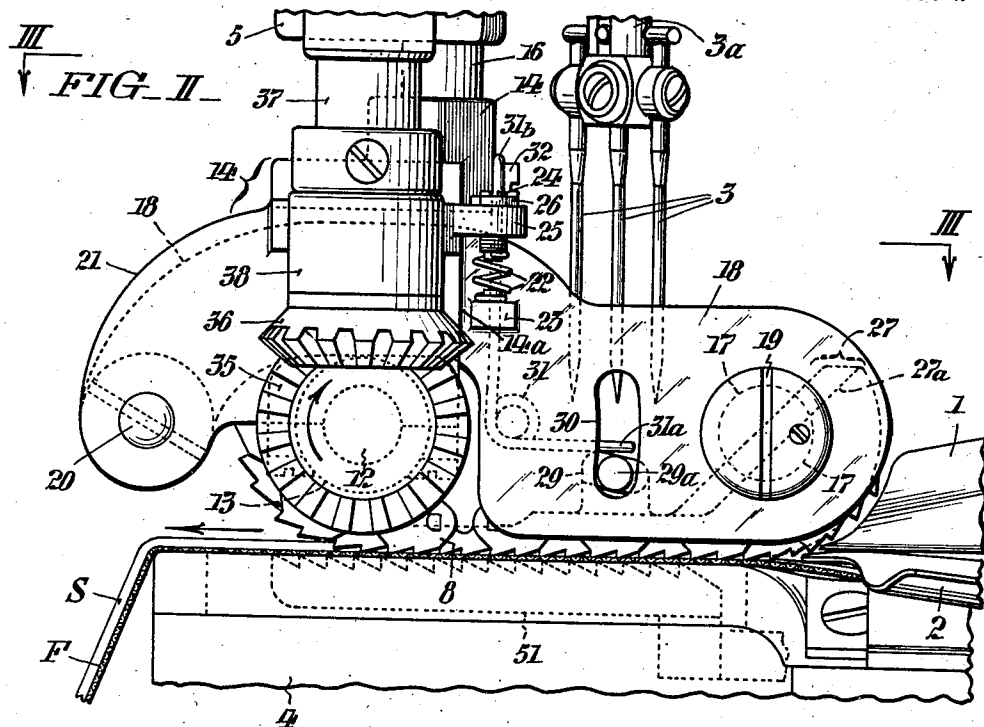
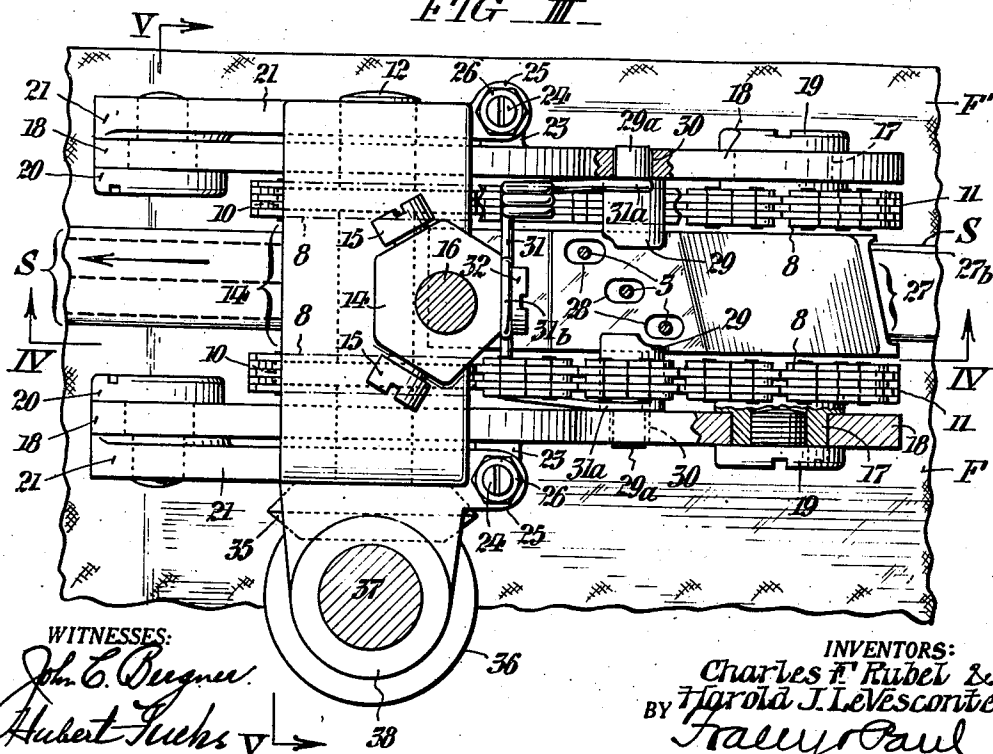


FIG. III



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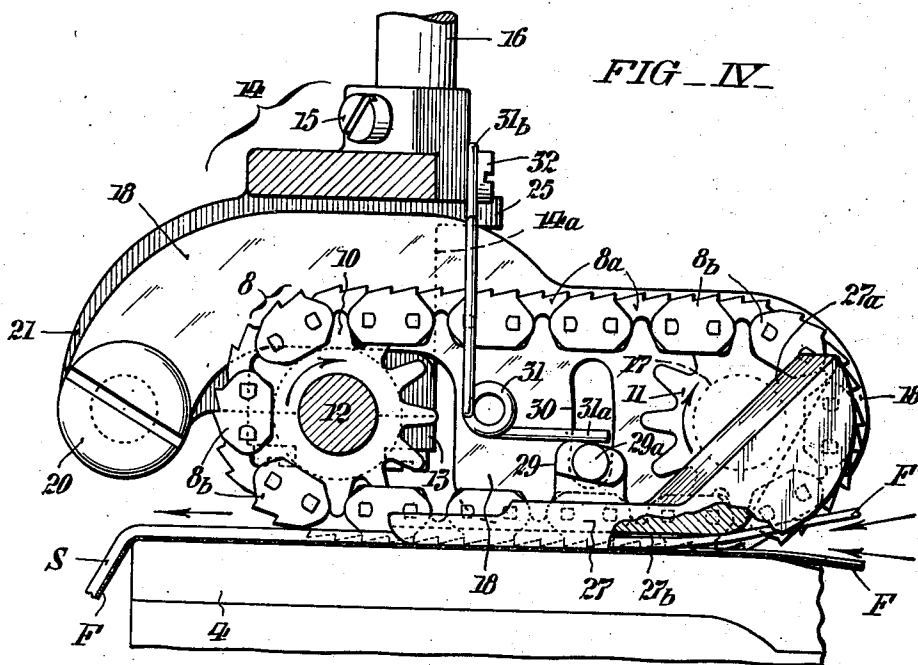
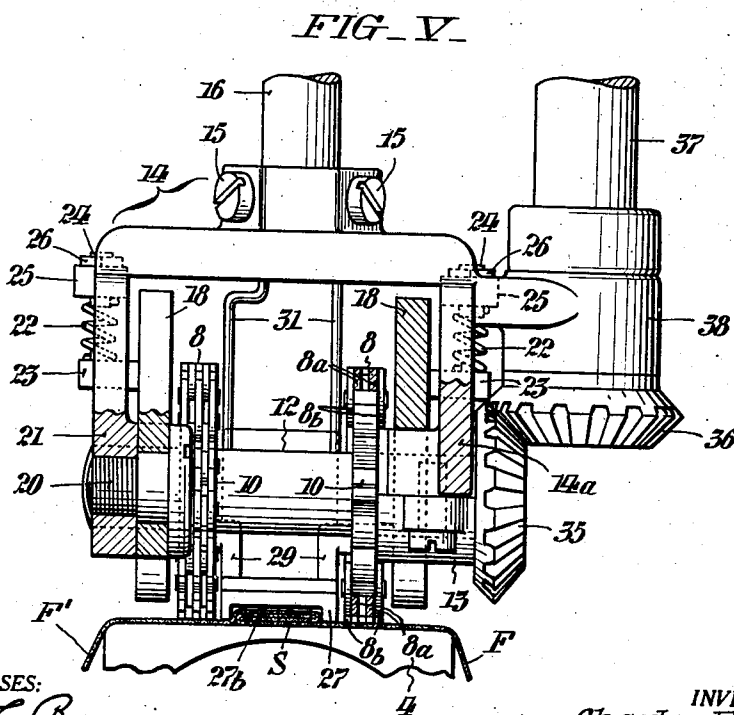
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FABRIC FEEDING MECHANISM FOR SEWING MACHINES

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4 Sheets-Sheet 3



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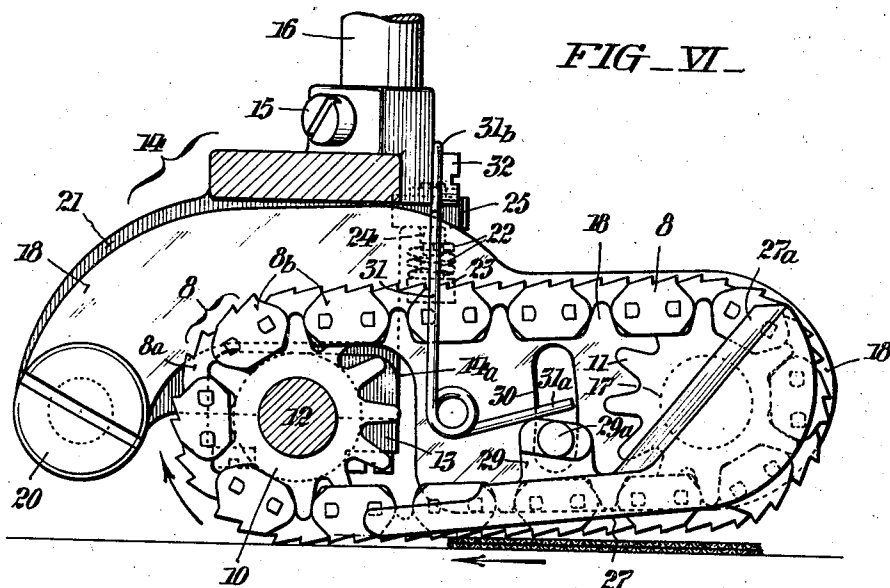
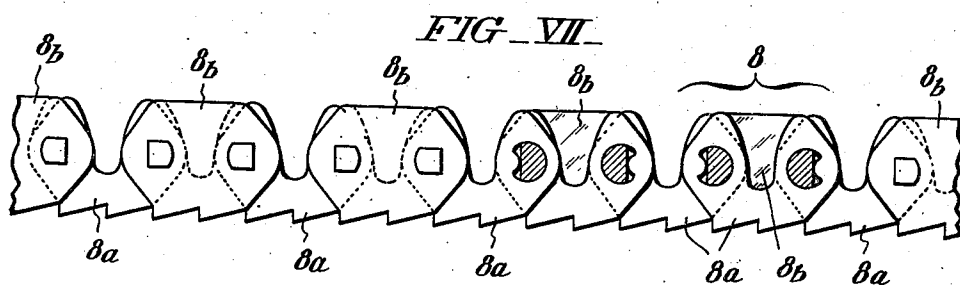
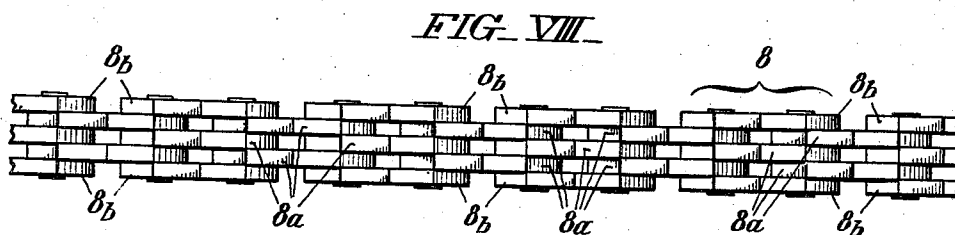
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FABRIC FEEDING MECHANISM FOR SEWING MACHINES

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,106,536

FABRIC FEEDING MECHANISM FOR SEWING MACHINES

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29 Claims. (Cl. 112-212)

This invention relates to mechanism useful in connection with sewing machines to feed fabric for seaming by the needle or needles of the machine.

5 An aim of our invention is to provide a simple form of feeding mechanism, which, by continuous contact over a considerable area can be relied upon to concurrently and uniformly progress lapped margins of two adjacent fabric sections with assurance against relative shifting between them as they are presented to the needle or needles of the sewing machine for seaming. The foregoing object we realize, as hereinafter more fully explained, in a feed mechanism characterized by one or more intermittently-operated, flexible, 10 endless, chain belts aligned in the direction of feed and extending forward and rearward of the seaming needle or needles, said belt or belts being formed from links with serrated edges to effectively grip the material being sewed.

15 A further object of our invention is to provide for the support of feed belt or belts by the presser bar of the sewing machine with capacity for yielding independently to up and down rocking movement to compensate for irregularities in the thickness of the material being sewed, and to enable said chain or chains to pass over cross seams without sacrifice in the effectiveness of their grip upon the material.

20 Another object of our invention is to provide in connection with feed mechanism organized as above set forth, means for inducing regulatable differential pressure upon opposite end wheels about which the belts are trained so that the mechanism can be adapted to different conditions of use.

25 Still other objects of our invention will be manifest from the detailed description following of the attached drawings, wherein Fig. I is a fragmentary view showing, in part, the rear elevation of a sewing machine embodying our novel feed mechanism.

30 Fig. II is a fragmentary detail view on a larger scale looking as indicated by the arrows II—II in Fig. I.

35 Fig. III is a plan section taken as indicated by the arrows III—III in Fig. II.

40 Fig. IV is a longitudinal sectional view taken as indicated by the arrows IV—IV in Fig. III.

45 Fig. V is a staggered fragmentary cross sectional view taken as indicated by the arrows V—V in Fig. III.

50 Fig. VI is a view corresponding to Fig. IV showing how the fabric feeding belts yield to angular

movement incident to starting of the fabric beneath it; and

Figs. VII and VIII are fragmentary views showing details of one of the feed chains.

The sewing machine chosen for the purposes of illustration herein is of a type designed for sewing triple stitch, double lap felled seams such as shown in cross section at S in Fig. V formed by concurrent passage of contiguous margins of two fabric sections F and F' through a suitable folder 10 partly shown at 1 and 2 in Fig. II. The three staggeringly-arranged seaming needles 3 (Figs. II and III) are secured as usual to a vertical needle bar 3a having guidance for axial movement in the head 5 (Fig. I) at the end of the gooseneck arm 15 6 which overreaches the work support 4 of the machine.

The feed mechanism with which the present invention is more especially concerned, is comprehensively designated in Fig. I by the numeral 7, 20 and, in this instance, comprises a pair of endless horizontal flexible belts in the form of "silent" chains 8 which are aligned in the direction of feed (indicated by the arrows in Figs. II and III) at opposite sides of the needles 3, and which extend 25 forwardly and rearwardly of the point of stitch formation. From Figs. VII and VIII it will be observed that the links of the chains 8 are of two kinds respectively designated 8a and 8b, and that said links are arranged in alternating groups of 30 twos and threes. Each of the double groups consists of two links of the type 8a, and the triple groups of a center link of the type 8a and two outer links of the type 8b. Also as shown, the links 8a are suitably notched to mesh with the teeth of spaced drive and idler sprocket wheels 10 and 11 about which the chains 8 are respectively 35 trained; while the links 8b (which are without notches) serve to prevent displacement of the chains by lapping the sides of said sprockets, see Fig. V, all of the chain links being formed with 40 serrated edges so as to effectively grip and thereby prevent relative shifting of the two fabric sections F, F', incident to progression of the latter along the work support 4. Chains of a greater 45 width may be substituted for the chains 8 if found expedient or necessary in machines for seaming relatively heavy or stiff fabrics.

The two drive sprocket wheels 10 are preferably integrally formed with a shaft 12 whereof 50 the ends are journaled in split bearings 13 at the lower ends of yoke extremities 14a pendant from a shank member 14 secured by screws 15 to the presser bar 16 of the machine. As usual in sewing machines, the presser bar 16 is suit- 55

ably guided for vertical or endwise movement in the head 5 of the machine frame, and is subject to the pressure of a relatively heavy spring (not shown) concealed within the hollow of said head.

5 The idler sprocket wheels 11, on the other hand, have integral shouldered trunnions 17 (Fig. III) which are journaled in bearing openings in the free ends of a pair of horizontal carrier arms 18, and held in place by axially engaging retaining screws 19, the heads of which oppose the trunnion shoulders. The carrier arms 18 are respectively fulcrumed at their opposite ends on shouldered stud screws 20 which are threaded into lateral extensions 21 of the pendant yoke arms 14a of the shank member 14, and which, it will be particularly noted from Figs. II, IV and VI, lie in the same horizontal plane with the shaft 12 of the drive sprockets 10. Downward pressure is exerted on the carrier arms 18 by a pair of helical springs 22, which, at their lower ends, abut against lugs 23 projecting outward laterally from said arms, and which, at their upper ends, abut against bottom shoulders of adjusting screws 24 threaded into outwardly projecting lateral lugs 25 on the shank member 14. Obviously, by adjusting the screws 24, the effective force of the springs 22 may be increased or decreased to correspondingly vary the pressure of the chains 8 at the sprockets 11 upon the fabric sections F and F'. After adjustment, the screws 24 are secured against accidental rotation by individually associated jamb nuts shown at 26.

Disposed in the interval between the two feed chains 8 is a presser foot 27 formed with an upwardly-sloping front portion 27a to facilitate entry of the fabrics F and F' therebeneath, the horizontal portion of said presser foot having elongate apertures or slots 28 for passage of the seaming needles 3. Projecting upwardly from the horizontal portion of the presser foot 27 are ears 29 with outwardly extending cylindric studs 29a which loosely engage arcuate slots 30 in the carrier arms 18, the curvature of said slots being coaxial with the fulcrum axes 20 of said arms 18. Normally, the studs 29a do not contact with the edges of the slots as shown in Fig. II. The presser foot 27 is yieldingly pressed downward by the lever ends 31a of a double coil spring 31, which, as shown in Figs. III, IV and V, has a central eye 31b for a screw 32 whereby it is secured to the shank member 14. As a consequence of this arrangement, the presser foot 27 is free to move up and down with the chains 8 as well as to tilt laterally in opposite directions in easing the passage beneath it of cross seams and other irregularities in the fabric sections F, F'. In order to bridge the folds of the seam S the bottom face of the presser foot 27 is longitudinally recessed or channelled as shown at 27b, in Figs. I, III and V. By virtue of being laterally spaced as shown, the chains 8, in conjunction with the channel 27b in the bottom of the presser foot 27, form an extensive guide passage forward and rearward of the needles 3 for directing the fabric edge fold incident to its progression by said chains. Suitable means such as shown in U. S. Patent No. 1,758,349 of May 13, 1930 to Joseph Berger et al. may be utilized in the sewing machine for raising the presser bar 16 in order to lift the feed chains 8 and the presser foot 27 clear of the work support 4.

Intermittent motion is imparted to the shaft 12 of the drive sprockets 10 through means including a bevel gear 35 integrally formed on said shaft at one end, and an intermeshing bevel gear 36

secured to the lower end of a vertical shaft 37 with journal support in a bearing boss 38 at one side of the shank member 14. At its upper end the vertical shaft 37 has a key 39 which slidingly engages a longitudinal slot 40 in a telescoping sleeve 41 having a universal connection 42 with an aligned vertical shaft 43 supported for rotation in a bearing boss 44 at the top of the head 5 of the sewing machine. The vertical shaft 43 is intermittently rotated through a roller clutch (not shown) concealed in the hollow cylindrical top portion 45 of the head 5, said clutch being actuated through a horizontal link 46 from a rocker arm 47 fulcrumed at 48 to one side of the gooseneck arm 6 of the machine. The rocker arm is oscillated by an eccentric 49, one a continuously revolving shaft 50 which may be actuated from the drive mechanism of the machine.

In the operation of our improved feed mechanism, as the fabric sections F, F' are first introduced beneath the feed belts 8, the carrier arms 18 will swing upwardly on the fulcrum stud connections 20 with the shank member 14 and thereby permit said belts to tilt as shown in Fig. VI. With continued progression of the fabric, the feed chains 8 are forced to take the true horizontal position as shown in Fig. IV under the yielding action of the presser bar 16. In passing over cross seams and the like in the fabric sections F and F', the chains 8 can rock independently about the sprocket axis 12 or together about the sprocket axis 17 as permitted under the yielding action of the springs 22 on the presser bar 16. Likewise, also, the presser foot 27 can move up and down with the chains 8 or tilt sidewise by virtue of the freedom allowed by the slots 30 in the carrier arms 18 and through the yielding permitted by the double coil spring 31. Moreover, through provision of the adjusting screws 24, the pressure on the free portions of the feed chains 8 at the sprockets 11 can be differentially regulated in respect to the pressure exerted by the presser bar 16 upon said chains at the drive sprockets 10 to adapt the mechanism to different conditions of use. Due to the fact that the aligned fulcrum axes 20 for the carrier arms 18 lie in the same horizontal plane with the drive sprocket shaft 12, the slack created in the chains is negligible incident to the rise and fall or rocking of the latter in the manner hereinbefore explained. When the presser bar 16 is raised to lift the feed belts 8 clear of the work support 4 of the machine, the presser foot 27 remains in contact with the fabrics F, F' until the lower edges of the arcuate slots 30 in the carrier arms 18 engage the trunnions 29. Then, as the upward movement of the presser bar 16 continues, the presser foot 27 will be swung anticlockwise on its trunnions due to camming between the lever ends 31a of the spring 31 and the inclined top surfaces of the lugs 29 on said presser foot in a manner which will be obvious from Fig. VI. Finally, however, the heel or back end of the presser foot 27 will be lifted clear of the work support 4 together with the feed chains 8 with said presser foot poised at an inclination. When the presser bar 16 is subsequently lowered, the heel of the presser foot will be the first to make contact with the fabrics F, F' and eventually assume its normal horizontal position with the chains 8 following suit.

The feed mechanism of our invention may be used alone, or it may be used in conjunction with conventional forms of feed elements such

as the four motion feed dog indicated in dotted lines at 51 in Fig. II.

For certain classes of work it may be convenient to employ but a single feed chain; while for other classes of work more than two chains may be found desirable. Our invention is therefore not to be construed as limited to the precise details of construction and arrangement herein shown and described by way of example, since these can obviously be varied extensively within the scope of the appended claims.

Having thus described our invention, we claim:

1. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation; means for maintaining the belt in yielding contact with the fabric being seamed, said means having capacity for angular movement to compensate for variations in the thickness of the fabric; and means for driving the belt.

2. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation and formed with links having edges shaped to engage the fabric being seamed in the machine; means for maintaining the belt in yielding contact with the fabric with capacity for angular movement to compensate for variations in the fabric thickness; and means for driving the belt.

3. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation; a presser bar; means on the presser bar to carry the belt with maintenance of the latter in yielding contact with the fabric being seamed in the machine, said means having capacity for angular movement to compensate for variations in the thickness of the fabric; and means for driving the belt.

4. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation; a presser bar; means pivotally connected to the presser bar to carry the belt with maintenance of the latter in yielding contact with the fabric being seamed in the machine and with capacity for angular movement to accommodate variations in fabric thickness; and means for driving the belt.

5. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means for maintaining the belts in independent yielding contact with the fabric being seamed; and means for moving the belts to progress the fabric along the work support of the machine.

6. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means for maintaining the belts in independent yielding contact with the fabric being seamed with capacity for movement to compensate for variations in the thickness of the fabric; and means for moving the belts to progress the fabric along the work support of the machine.

7. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means for yieldingly maintaining the belts in contact with the fabric being seamed with capacity for independent up and down movement to compensate for variations in the thickness of the fabric; and means for moving the belts to

progress the fabric along the work support of the machine.

8. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the seaming needle of the sewing machine; means for yieldingly maintaining the belts in contact with the fabric being sewed with capacity for up and down movement independent of each other to compensate for variations in the thickness of the fabric; and means for moving the belts to progress the fabric along the work support of the machine.

9. Feed mechanism for sewing machines comprising a pair of flexible endless chain belts respectively at opposite sides of the needle of the sewing machine formed from links with edges shaped to engage the fabric being seamed in the machine; means for maintaining the belts in yielding contact with the fabric with capacity for independent angular movement to compensate for variations in fabric thickness; and means for moving the belts to progress the fabric along the work support of the machine.

10. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; pairs of coaxial driven and idler wheels for the belts; means for separately supporting the driven and idler wheels with capacity for independent up and down movement; and means for exerting pressure upon the driven wheels to maintain the belts yieldingly in contact with the fabric being seamed in the machine; and means for moving the belts to progress the fabric along the work support of the machine.

11. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; pairs of coaxial driven and idler wheels for the belts; means for separately supporting the driven and idler wheels with capacity for independent up and down movement; means for exerting differential pressure upon the driven and idler wheels; and means for moving the belts to progress the fabric along the work support of the machine.

12. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means on the presser bar of the sewing machine to carry the belts with maintenance of the latter in independent yielding contact with the fabric being seamed in the machine; and means for moving the belts to progress the fabric along the work support of the machine.

13. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; spaced coaxial pairs of driven and idler wheels for the belts; means for supporting the driven wheels with capacity for up and down movement relative to the work support of the machine; means pivoted to said support for carrying the axes of the idler wheels with capacity for up and down movement independent of the driven wheels; and means for moving the belts to progress the fabric along the work support.

14. Feed mechanism for sewing machines comprising a pair of flexible endless feed belts respectively at opposite sides of the needle of the sewing machine; spaced coaxial pairs of driven and idler wheels for the belts, a presser influenced journal member for the driven wheels; a pair of arms pivoted to opposite sides of the journal member beyond the axis of the driven wheels in

- the same horizontal plane therewith carrying the idler wheels at their free ends with capacity for up and down movement independent of the driven wheels; separate springs operative between the journal member and the arms to assist in maintaining the belts yielding in contact with the fabric being seamed in the machine; and means for moving the belts to progress the fabric along the work support of the machine.
10. 15. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation; means for maintaining the belt in yielding contact with the fabric being seamed, said means having capacity for angular movement to compensate for variations in fabric thickness; means for driving the belt; and a presser foot movable up and down with the belt.
- 15 16. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation; means for maintaining the belt in yielding contact with the fabric being seamed with capacity for angular movement to compensate for variations in fabric thickness; means for driving the belt; and a presser foot supported with capacity to move up and down with the belt, as well as with capacity to tilt sidewise.
- 20 17. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means for maintaining the belts in independent yielding contact with the fabric being seamed; means for moving the belts to progress the fabric in the machine; and a presser foot movable up and down with the belts.
- 25 18. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means for maintaining the belts in independent yielding contact with the fabric being seamed; means for moving the belts to progress the fabric in the machine; and a presser foot movable up and down with the belts in the interval between the latter.
- 30 19. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; means for maintaining the belts in independent yielding contact with the fabric being seamed; means for moving the belts to progress the fabric in the machine; and a presser foot supported with capacity for up and down movement with the belts, as well as for sidewise tilting movement.
- 35 20. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; pairs of coaxial driven and idler wheels for the belts; means for separately supporting the driven and idler wheels with capacity for independent up and down movement; means for exerting differential pressure upon the driven and idler wheels; means for moving the belts to progress the fabric in the machine; and means whereby the differential pressure on the driven and idler wheels may be regulated.
- 40 21. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine; pairs of coaxial driven and idler wheels for the belts; means for supporting the driven wheels; a pair of pivoted arms supporting the idler wheels with capacity for independent up and down movement in respect to the driven wheels; means for exerting differential pressure upon the driven and idler wheels; means for moving the belts to progress the fabric along the work support of the machine; a presser foot disposed between the two belts and having pivot trunnions loosely engaged with arcuate slots in the arms aforesaid concentric with the fulcrum centers of said arms; and spring means to urge the presser foot into contact with the fabric, with capacity to move up and down either with or independently of the belts, as well as to tilt sidewise.
- 45 22. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation and adapted to engage one face of fabric being seamed; means for maintaining the belt in yielding contact with the fabric, said means having capacity for angular movement to compensate for variations in the thickness of the fabric; means for driving the belt; and cooperating feed means for engaging the opposite side of the fabric in the region of said belt.
- 50 23. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation and adapted to engage one face of fabric being seamed; means for maintaining the belt in yielding contact with the fabric, said means having capacity for angular movement to compensate for variations in the thickness of the fabric; means for driving the belt; and a cooperating feed dog for engaging the opposite side of the fabric in the region of the belt.
- 55 24. Feed mechanism for sewing machines comprising a flexible endless belt extending forwardly and rearwardly of the point of stitch formation and adapted to engage one face of fabric being seamed; means for maintaining the belt in yielding contact with the fabric, said means having capacity for angular movement to compensate for variations in the thickness of the fabric; means for driving the belt; a presser foot for holding down the fabric adjacent the belt; and cooperating feed means for engaging the opposite side of the fabric in the region of the presser foot and the belt.
- 60 25. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine for engaging one side of the fabric being seamed; means for maintaining the belts in independent yielding contact with the fabric; means for moving the belts to progress the fabric along the work support of the machine; and cooperating feed means for engaging the opposite side of the fabric in the region of the belts.
- 65 26. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine for engaging one side of the fabric being seamed; means for maintaining the belts in independent yielding contact with the fabric; means for moving the belts to progress the fabric along the work support of the machine; and a cooperating feed dog for engaging the opposite side of the fabric in the region of the belts.
- 70 27. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively at opposite sides of the needle of the sewing machine for engaging one side of the fabric being seamed; means for maintaining the belts in independent yielding contact with the fabric; means for moving the belts to progress the fabric along the work support of the machine; a
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presser foot for holding down the fabric in the interval between the belts; and cooperating feed means for engaging the opposite side of the fabric in the region of the presser foot and the belts.

- 5 28. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively disposed at opposite sides of the needle of the sewing machine and laterally spaced to provide a guide passage between them for interfolded fabric edges being seamed together; means for maintaining the belts in yielding contact with the fabric with capacity for independent angular movement to compensate for irregularities in the thickness of said fabric; and means for
10 moving the belts to progress the fabric.
15

29. Feed mechanism for sewing machines comprising a pair of flexible endless belts respectively disposed at opposite sides of the needle of the sewing machine and laterally spaced to provide a passage between them for interfolded fabric edges being seamed together; means for maintaining the belts yieldingly in independent contact with the fabric; means for moving the belts to progress the fabric; and a presser foot with a channel in its bottom cooperating to guide the fabric fold in the interval between the belts past the needle.

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