May 2, 1933. A. GRIEB 1,906,317

WORK HOLDING AND GUIDING MECHANISM FOR SEWING MACHINES

Filed Feb. 6, 1931 4 Sheets-Sheet 1

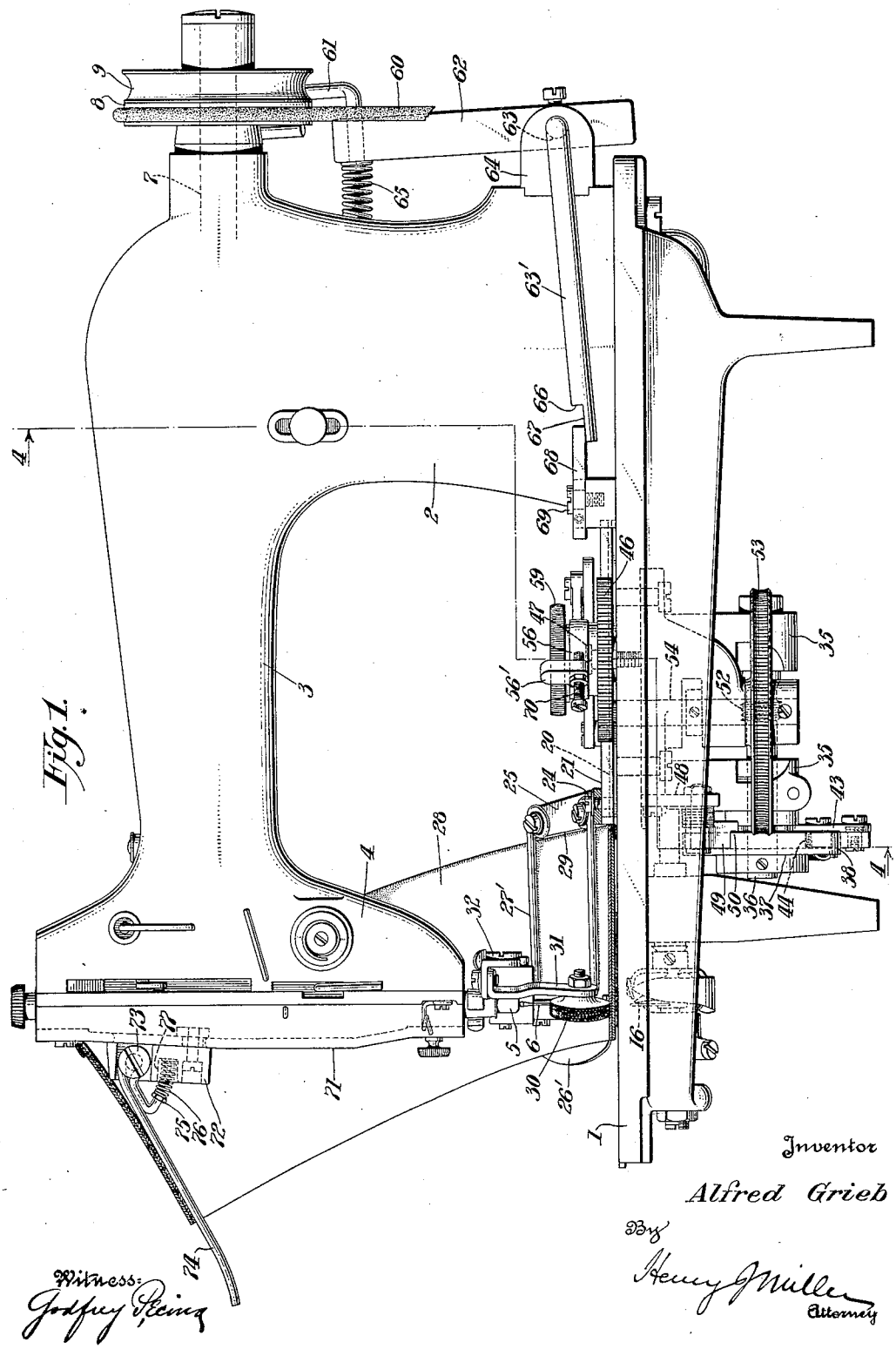


Fig. 1.

Witness:
Godfrey Steinz

Inventor
Alfred Grieb
By
Henry J. Miller
Attorney

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WORK HOLDING AND GUIDING MECHANISM FOR SEWING MACHINES

Filed Feb. 6, 1931 4 Sheets-Sheet 2

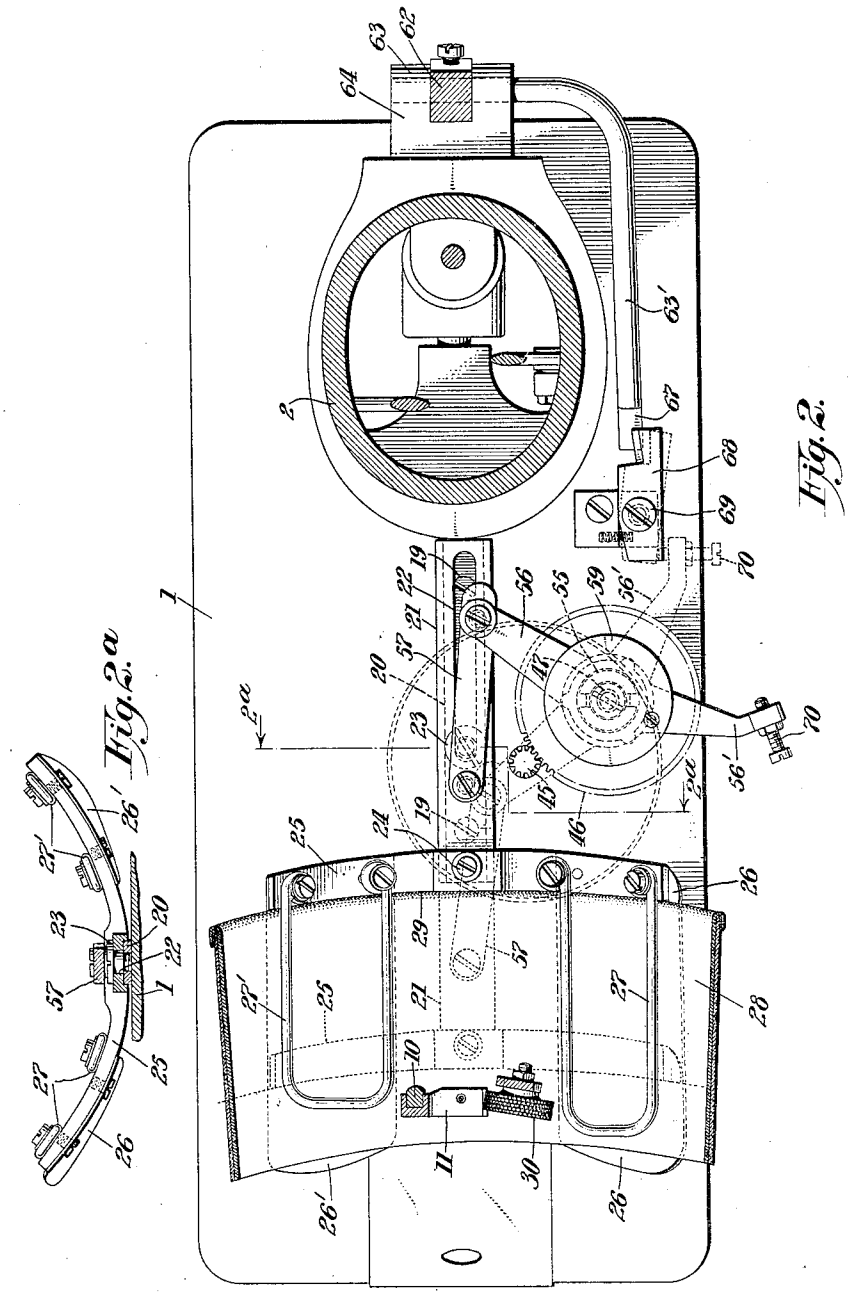


Fig. 2.



Fig. 2a

Inventor

Alfred Grieb

Witness:

Godfrey Stecina

By Henry J. Miller

Attorney

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WORK HOLDING AND GUIDING MECHANISM FOR SEWING MACHINES

Filed Feb. 6, 1931 4 Sheets-Sheet 3

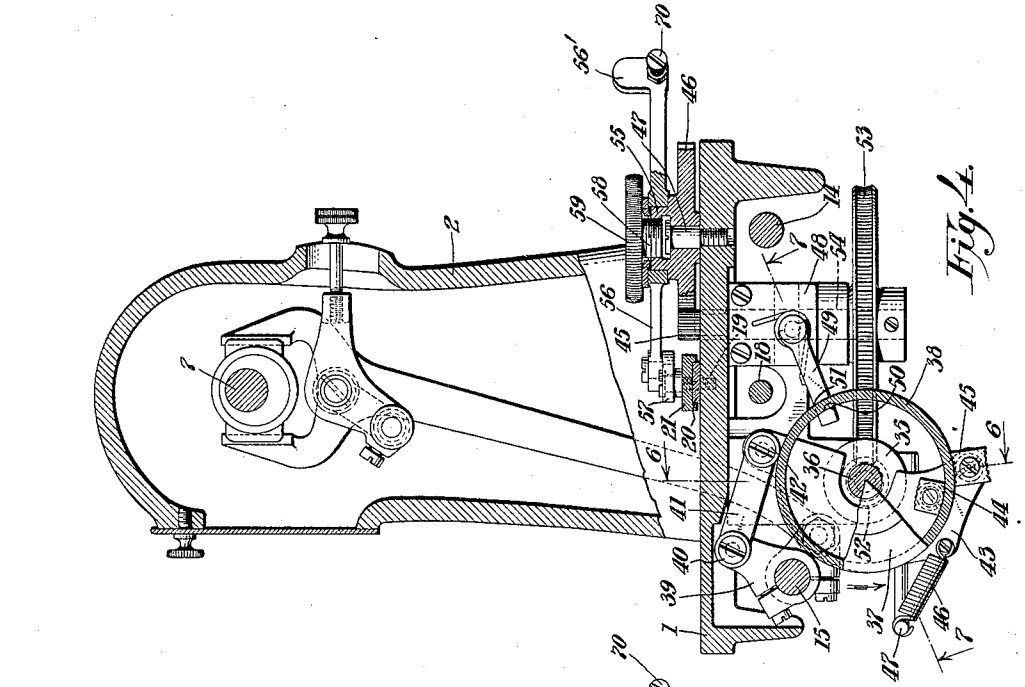


Fig. 4.

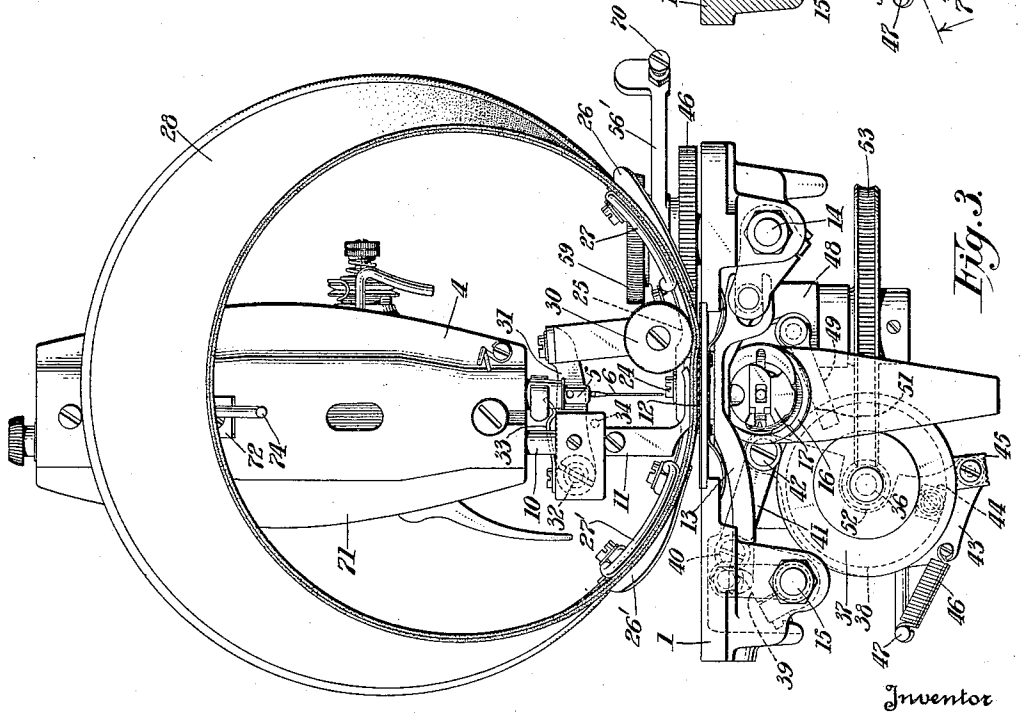


Fig. 3.

Inventor
Alfred Grieb

Witness:
Godfrey Peering

By Henry J. Miller
Attorney

May 2, 1933. A. GRIEB 1,906,317

WORK HOLDING AND GUIDING MECHANISM FOR SEWING MACHINES

Filed Feb. 6, 1931 4 Sheets-Sheet 4

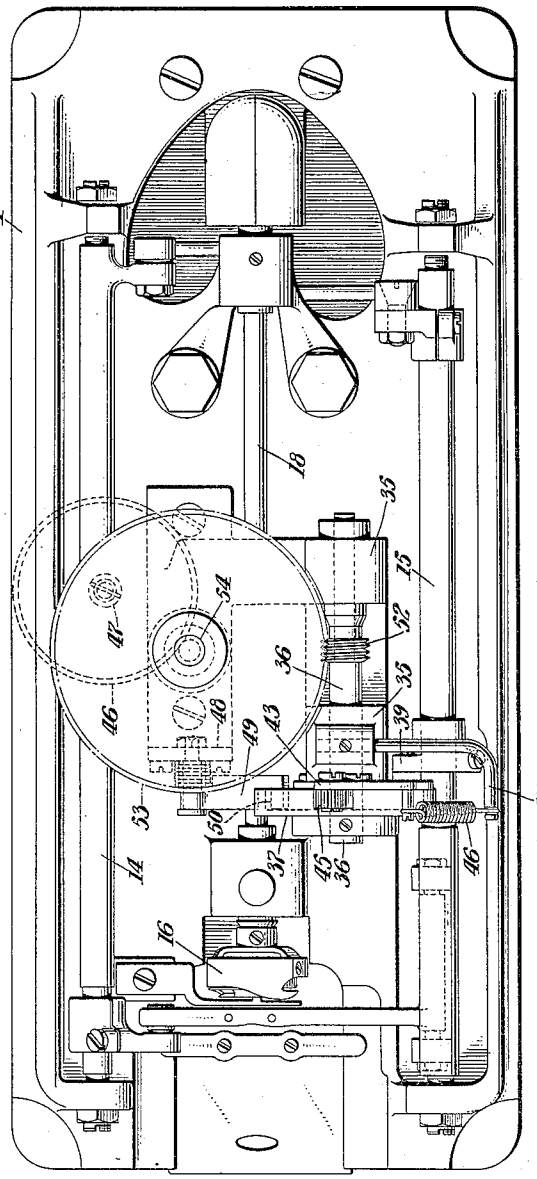



Fig. 5.

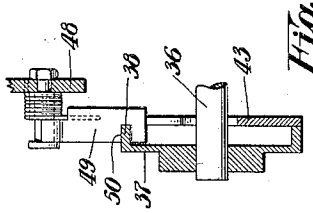



Fig. 7.

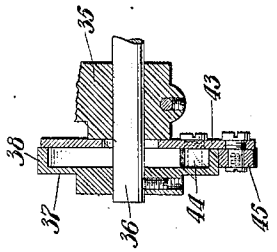



Fig. 6.

Inventor
Alfred Grieb

Witness:
Godfrey Peters

By Henry J. Miller
Attorney

Patented May 2, 1933 1,906,317

# UNITED STATES PATENT OFFICE

ALFRED GRIEB, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY

## WORK-HOLDING AND GUIDING MECHANISM FOR SEWING MACHINES

Application filed February 6, 1931. Serial No. 513,920.

This invention relates to sewing machines and has for an object to provide simplified and improved work-supporting and guiding mechanism which is specially adapted for spirally stitching endless bands and is useful in stitching frusto-conical hat-brims such as are customarily found in sailors' hats. Another object of the invention is to provide simplified means for slowing up the lateral shifting movement of the work, as the stitching progresses from convolutions of smaller circumference to convolutions of larger circumference of the hat-brim, to maintain a uniform spacing of the convolutions of the spirally stitched seam. Another object of the invention is to provide a work-handling mechanism of the type in question, in which the work may be readily inserted and from which it may be readily removed; the work requiring no attention from the operator during the sewing operation. Still further, the invention has for an object to provide for the support, during the stitching operation, of the portions of the circular band or hat-brim which are remote from the stitching point, so that such portions will readily travel in a circuitous path under the propelling force of the usual sewing machine feed-dog.

The invention comprises the devices, combinations and relative arrangements of parts hereinafter described and claimed.

The features of the invention and the advantages attained thereby will be readily understood by those skilled in the art from the following detailed description of a specific embodiment of the invention illustrated in the accompanying drawings, in which Fig. 1 is a side elevation of a sewing machine fitted with work-supporting and guiding mechanism embodying the invention and specially adapted for spirally stitching the frusto-conical brims of sailors' hats. Fig. 2 is a horizontal section through the bracket-arm standard of the machine, showing the bed and the work-guiding devices mounted thereon in plan. Fig. $2^a$ is a section on the line $2^a$—$2^a$, Fig. 2. Fig. 3 is a front end elevation of the machine. Fig. 4 is a transverse vertical sectional view through the machine-bed substantially on the line 4—4, of Fig. 1. Fig. 5 is a bottom plan view of the machine and Figs. 6 and 7 are sectional views on the lines 6—6 and 7—7, respectively, in Fig. 4.

The machine is constructed with the flat bed 1 from which rises the standard 2 of the bracket-arm 3 terminating in the head 4 in which is mounted the usual reciprocating needle-bar 5 carrying the needle 6 and driven by the usual connections (not shown) from the main-shaft 7 which carries the tight and loose pulleys 8 and 9, respectively. There is also mounted in the head 4 the usual spring-pressed presser-bar 10 carrying the presser-foot 11 which presses the work upon the usual feed-dog 12 carried by the feed-bar 13 given its rising-and-falling and feed-and-return movements through the usual connections with the feed-lift rock-shaft 14 and feed-advancing rock-shaft 15. These rock-shafts are mounted as usual below the bed 1 and are operated in the usual manner from the main-shaft 7. The needle 6 cooperates with the usual rotary hook device 16 to form stitches; such device including the usual bobbin-thread case 17 and being carried by the rotary hook shaft 18 connected as usual to the main-shaft 7.

Disposed centrally and longitudinally of the bed 1 and fixed to the latter by screws 19 is the guide-bar 20 upon which is mounted a slide-bar 21. The slide-bar 21 is formed with a longitudinally extending slot 22 through which passes the shank of the retaining screw 23 threaded into the guide-bar 20. Secured to one end of the bar 21 by means of the screw 24, Figs. 2 and $2^a$, is the upwardly concaved bar 25. The bars 21 and 25 are in the form of a T. Screwed

to the under side of the bar 25 are the thin sheet-metal work-supporting plates 26 and 26′ which extend transversely of the line of seam-formation; the plate 26 being in front of the feed-dog 12 and the plate 26′ being in rear of the feed-dog 12. The plates 26 and 26′ are spaced apart in this manner so that the work may be properly supported as it approaches and recedes from the stitch-forming mechanism and so that the presser-foot 11 and feed-dog 12 may engage and feed the work in the space between the plates 26, 26′. Secured to the upper side of the bar 25 are the work-retaining guides 27, 27′ which overlie their respective under plates 26, 26′ and are spaced from the latter sufficiently to form passageways for the band 28 to be stitched.

The edge 29 of the bar 25 is engaged by one edge of the band 28 and constitutes an edge-guide for the work which latter is automatically and continuously retained in engagement with the guiding edge 29 by means of the inclined presser-roller 30, Fig. 2. The presser-roller 30 is carried by the arm 31 which is pivotally secured at 32 to the presser-bar 10 and is pressed downwardly by the spring 33 to cause the roller 30 to yieldingly engage the work immediately in advance of the feed-dog 12 and presser-foot 11. When the presser-foot is lifted for removal of the work, the stop-pin 34 engages the under edge of the bar 31 and prevents abnormal depression of the roller 30 below the under surface of the presser-foot 11 by the spring 33.

The following mechanism is provided for imparting a slow motion to the bar 21, during the operation of the machine, to move the work-supporting and guiding mechanism laterally of the line of seam-formation. Mounted in bearing lugs 35 below the bed 1 is the shaft 36 to one end of which is fixed the clutch-disk 37 having a cylindrical clutch-rim 38. Clamped upon the feed-advancing rock-shaft 15 is the arm 39 to which is connected at 40 one end of the link 41 the other end of which is connected at 42 to the upper end of the clutch-lever 43 having pivotally mounted on one face thereof the inner and outer clutch-dogs 44 and 45 adapted to engage the inner and outer surfaces of the rim 38 of the clutch-disk 37. It will be observed, by referring to Figs. 3 and 4, that the pivot-point for the inner clutch-dog 44 is off-set from a line connecting the pivot-points of the outer clutch-dog 45 and the screw 42 at the upper end of the clutch-plate 43. The clutch-plate 43 is connected adjacent its lower end by means of the spring 46 to the anchor-post 47. When the rockshaft 15 is moving counterclockwise, Fig. 4, to give to the feed-dog 12 its active feeding movement, the link 41 is caused to pull the upper end of the clutch-plate 43 to the left, thereby cramping the clutch-dogs 44 and 45 into gripping engagement with the cylindrical rim 38 of the clutch-plate 37 and giving to the latter and to the shaft 36 a turning movement. During the reverse movement of the rock-shaft 15 and parts connected thereto, the spring 46 will impart a recovery motion to the lower end of the plate 43 and cause the clutch-dogs 44 and 45 to slip upon and relative to the rim 38. Thus an intermittent rotary motion is imparted to the shaft 36 from the feed-and-return rock-shaft 15. To prevent retrograde motion of the clutch-disk 37, there is pivoted to the stationary depending supporting plate 48 a spring-pressed dog-arm 49 having in one edge a notch 50 embracing the rim 38. The corner or edge 51 of this dog-arm impinges upon the outer peripheral surface of the rim 38 and prevents retrograde or clockwise motion of the clutch-disk 37, Fig. 4; the arm 49 being directed slightly above the axis of the shaft 36, as shown in Figs. 3 and 4.

The shaft 36 carries a worm 52 which meshes with the gear 53 on the vertical shaft 54 journaled in the bed 1 and having at its upper end a pinion 45 which meshes with a gear 46 journaled on the stud-screw 47 upon the face of the bed 1. The gear 46 has a reduced hub 55, Fig. 4, upon which is mounted the lever-arm 56 one end of which is connected by means of the link 57 to the slide-bar 21. The reduced hub 55 of the arm 56 is threaded to receive the stem 58 of the clamping nut 59 which, when tight, binds the arm 56 to the gear 46. When the nut 59 is loosened, the arm 56 may be turned relative to the gear 46. This expedient for releasably clamping the arm 56 to the gear 46 is the well known form of sewing machine balance-wheel clutch disclosed, for example, in the patent to McCune, No. 268,703, of December 5, 1882.

The machine is driven by means of a belt 60 controlled by the belt-shipper 61 carried by the belt-shipper arm 62 fixed to the pivot-shaft 63 which is journaled in the bracket 64 fixed to the standard 2. The spring 65 which is interposed between the standard 2 and the belt-shipper arm 62 tends to move the belt-shipper in a direction to shift the belt onto the loose pulley 9 to stop the machine. One end of the pivot-shaft 63 projects out of the bracket 64 and is bent to form an angular extension 63′ disposed in front of the base of the standard 2. The free end of the angular extension 63′ is notched at 66 to form a flat upper surface 67 which is engaged by the trigger-lever 68 fulcrumed at 69 on the bed 1. The arm 56′ of the lever 56 carries an adjustable tripping screw 70 which, at the end of a sewing operation, engages the trigger-lever 68, Fig. 2, and shifts it to dotted line position,

thereby releasing the belt-shipper arm for movement to stopping position. The machine is started by a downward pressure exerted upon the angular extension 63′ by the operator.

By referring to Fig. 2, it will be observed that as the stitching progresses, the parts move from their full line to their dotted line positions, during which movement the angle between the arm 56 and the link 57 becomes more and more obtuse and the lateral movement of the edge-guide 29 diminishes for a given angular movement of the shaft 54. In other words, as the spirally stitched seam progresses from convolutions of smaller circumference to convolutions of larger circumference, the number of stitches per convolution of the spiral increases and the mechanism compensates for this by moving the edge-guide 29 laterally substantially the same distance per convolution for the increased number of stitches in the convolutions of larger circumference. When the sewing is completed, the operator raises the presser-foot for removal of the work and then loosens the nut 59 and re-sets the guiding mechanism in its initial position, subsequently clamping the nut 59.

To support the band or hat-brim 28 so that it will not require attention by the operator during the sewing operation, there is mounted on the face-plate 71 a block 72 to which is pivotally secured at 73 a work-supporting arm 74 the curved extension 75 of which is embraced by one end of a coil-spring 76 the other end of which is seated in an aperture 77 in the block 72. The spring 76 exerts a yielding lifting action on the arm 74 and maintains the latter at all times in light lifting engagement with the band or hat-brim 28, thereby holding the latter in approximately circular condition as the sewing proceeds. The hat-brim is easily placed over the arm 74 by depressing the latter.

Having thus set forth the nature of the invention, what I claim herein is:—

1. The combination with a sewing machine having stitch-forming mechanism, work-feeding mechanism, and a main-shaft connected to drive said mechanisms, of a work-guide movable laterally of the line of seam-formation, and means driven by said main-shaft for moving said guide, said means including a circularly moving propelling arm connected at its free end to said guide and operating to automatically vary the speed of lateral movement of the guide relative to a constant machine speed.

2. A sewing machine having, in combination, a frame including a bed and an overhanging bracket-arm stitch-forming mechanism, work-feeding mechanism, a work-guide, machine-driven means for moving said work-guide laterally of the line of seam-formation, and a yielding work-support mounted on said bracket-arm.

3. A sewing machine having, in combination, a frame including a bed and an overhanging bracket-arm, stitch-forming mechanism, work-feeding mechanism, a work-guide, machine-driven means for moving said work-guide laterally of the line of seam-formation, and a pivotally mounted work-supporting arm mounted on said bracket-arm and projecting beyond the free end of the latter.

4. A sewing machine having, in combination, a frame including a bed and an overhanging bracket-arm, stitch-forming mechanism, work-feeding mechanism, a work-guide, machine-driven means for moving said work-guide laterally of the line of seam-formation, and an upwardly spring-pressed work-support carried by said bracket-arm.

5. A sewing machine having, in combination, a bed, stitch-forming mechanism, work-feeding mechanism, a work-guide movable on said bed laterally of the line of seam-formation, a gear-wheel mounted on said bed and connected to be driven by the work-feeding mechanism, and an arm actuated by said gear-wheel, and connected to move said work-guide.

6. A sewing machine having, in combination, stitch-forming mechanism, work-feeding mechanism, a main-shaft connected to drive said mechanisms, power-means, a stopping device for interrupting driving relation between the power-means and the main-shaft, a work-guide movable laterally of the line of seam-formation, machine-driven mechanism for so moving said work-guide, and means for tripping said stopping device when the work-guide is laterally moved to a predetermined limiting position.

7. Work-guiding means for sewing machines comprising a machine bed, a carrier-bar slidably mounted on said machine bed, a guide-head fixed to one end of said bar and forming a T therewith, said guide-head being upwardly concave, work-supporting guides secured to the ends of said guide-head and spaced above said bed, and work-confining guides secured to said guide-head and spaced each above a respective one of said work-supporting guides.

8. The combination with a sewing machine having stitch-forming mechanism, a feed-dog, and a feed-and-return rock-shaft connected to said feed-dog, of a work-guide movable laterally of the line of seam-formation, and means actuated by said feed-and-return rock-shaft independently of said feed-dog for moving said guide.

9. In a sewing machine, a bed, stitch-forming mechanism, work-feeding mechanism, a main-shaft connected to drive said mechanism, power means, a stopping device

for interrupting the flow of power from the power-means to the main-shaft, a work-guide movable laterally of the line of seam-formation, machine driven means for so moving said work-guide, said means including a vertical shaft passing through the machine bed and an arm disposed above said bed and connected to be actuated by said shaft, and means actuated by said arm for tripping said stopping device.

In testimony whereof I have signed my name to this specification.

ALFRED GRIEB.