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W. C. VAN NESS ET AL

1,884,404

FEEDING MECHANISM FOR SEWING MACHINES

Filed May 21, 1931

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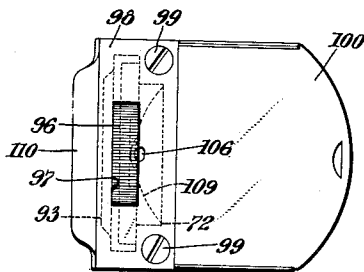
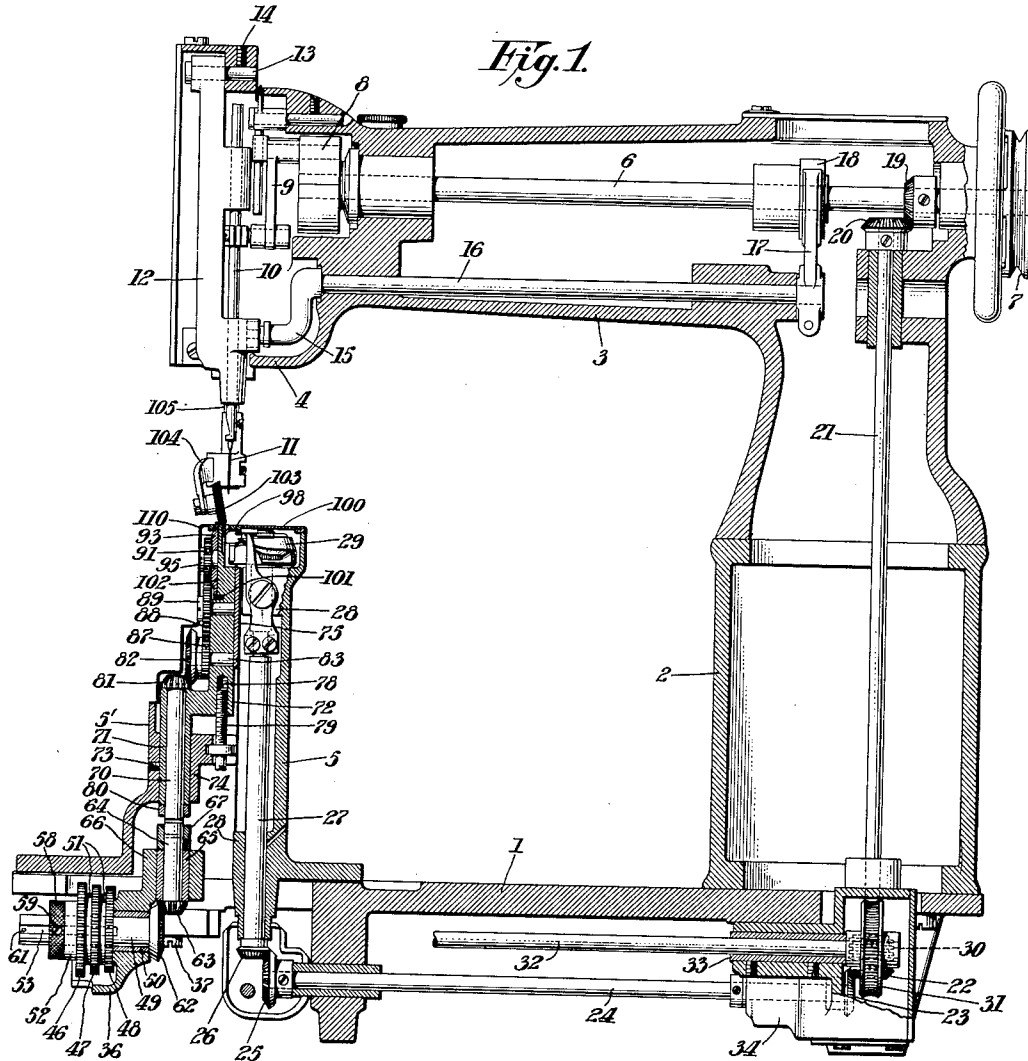


Fig. 2.

Inventors

William C. Van Ness
and Frederic M. Card

Witness:

Joseph Secina

234

Henry Miller

Attorney

Oct. 25, 1932.

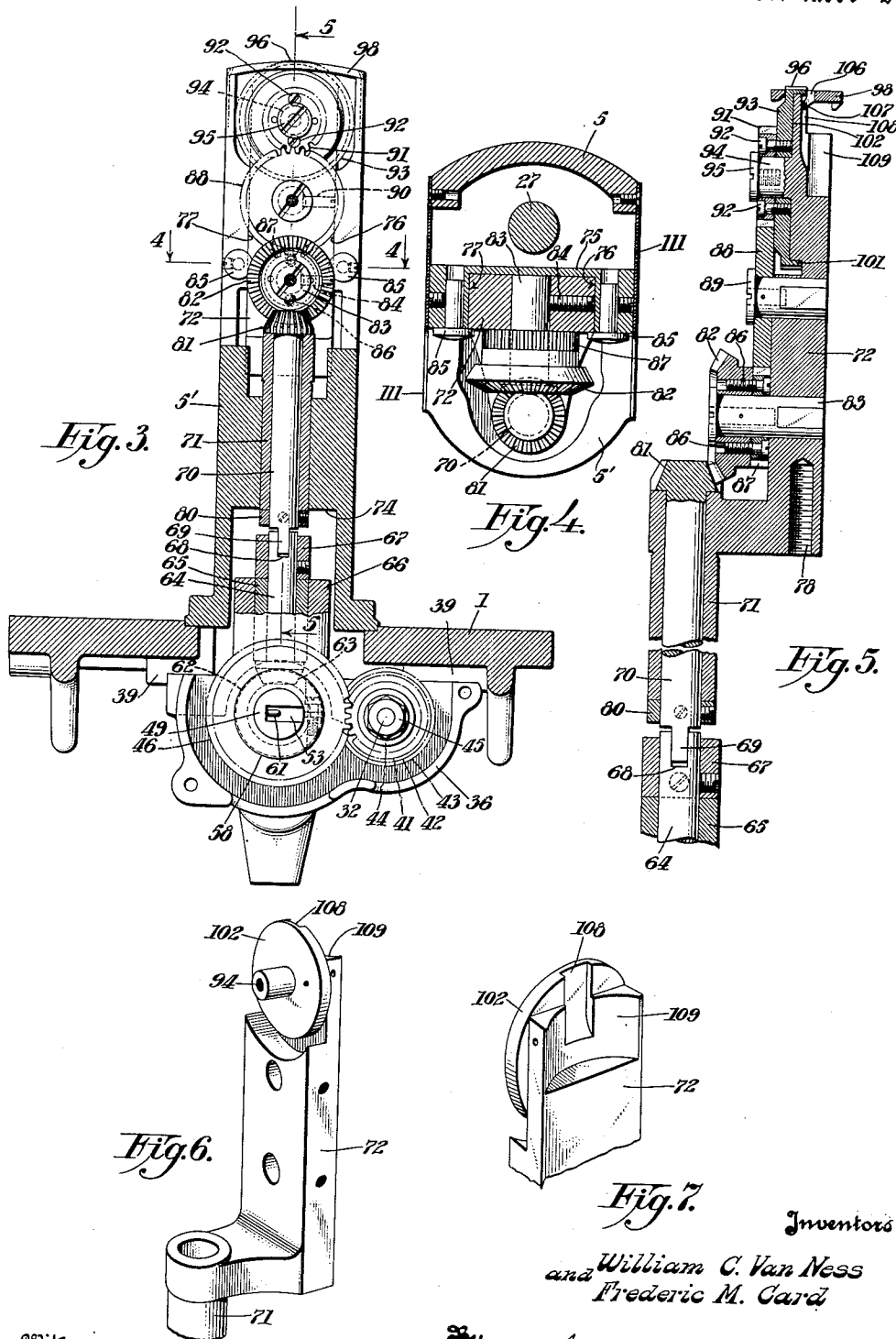
W. C. VAN NESS ET AL

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3 Sheets-Sheet 2



Witness:
Joseph Seering

284

Inventors
William C. Van Ness
and *Frederic M. Card*

Henry Miller Attorney

Oct. 25, 1932.

W. C. VAN NESS ET AL

1,884,404

FEEDING MECHANISM FOR SEWING MACHINES

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3 Sheets-Sheet 3

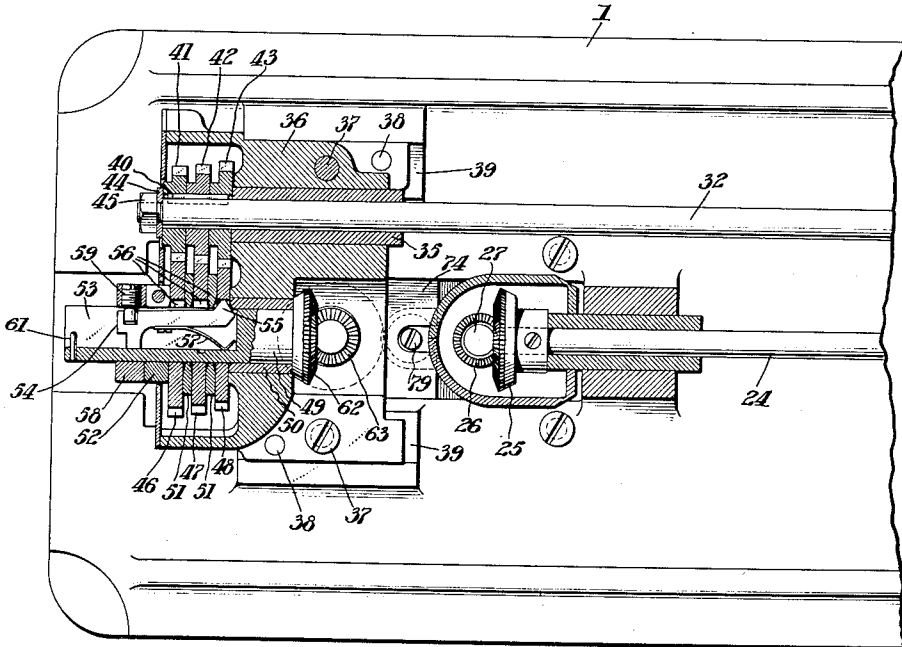


Fig. 8.

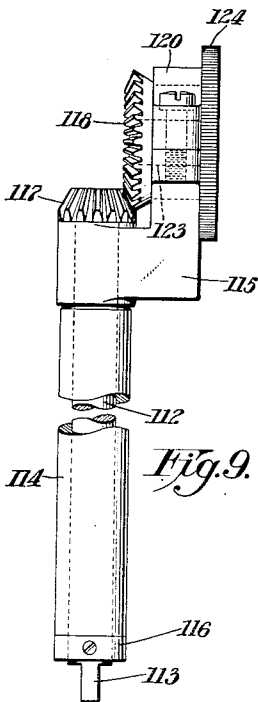
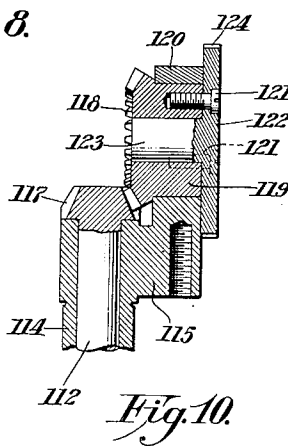


Fig. 9.

Fig. 10.

Inventors

William C. Van Ness
and Frederic M. Card

Witness:
Joseph Spring

By Henry J. Miller

Attorney

UNITED STATES PATENT OFFICE

WILLIAM C. VAN NESS, OF BROOKLYN, NEW YORK, AND FREDERIC M. CARD, OF BRIDGE-PORT, CONNECTICUT, ASSIGNORS TO THE SINGER MANUFACTURING COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY

FEEDING MECHANISMS FOR SEWING MACHINES

Application filed May 21, 1931. Serial No. 538,918.

This invention relates to improvements in feeding mechanisms for sewing machines and has for its primary object to provide a sewing machine having a work-supporting post of small compass with an efficiently operating wheel-feed mechanism for advancing the work past the stitch-forming mechanism.

A preferred embodiment of the invention consists in the novel features of construction and in the arrangement and combination of parts hereinafter described in connection with the accompanying drawings, in which Fig. 1 is a longitudinal section, partly in front elevation, of a sewing machine containing one embodiment of the present improvement. Fig. 2 is a top-plan view of the work-supporting top of the machine post. Fig. 3 is a vertical section, partly in elevation, of the post component supporting the feed-wheel mechanism, the cover-plates being removed. Fig. 4 is an enlarged sectional view substantially on the line 4—4 of Fig. 3. Fig. 5 is a sectional view of the feed-wheel bracket, substantially on the line 5—5 of Fig. 3. Figs. 6 and 7 represent, in perspective, the feed-wheel supporting frame as viewed from opposite sides thereof. Fig. 8 is a bottom-plan view of the machine bed, with part of the feed-wheel actuating mechanism shown in section. Fig. 9 is a front elevation of a modified feed-wheel supporting bracket. Fig. 10 is a transverse section of said modified supporting bracket and of the feed-wheel carried thereby.

The sewing machine illustrated in the accompanying drawings contains stitch-forming and feed-wheel actuating mechanism of the character disclosed in the United States patent to H. Corral et al., No. 1,414,625, May 2, 1922, and in the pending patent application of J. A. Knox, filed May 17, 1929, with Serial No. 363,832.

In the present case, the sewing machine has a frame comprising a bed-plate 1 from one end of which rises the hollow standard 2 supporting a tubular bracket-arm 3 which terminates in a head 4 overhanging the bed-plate 1. Disposed directly below the bracket-arm head 4 is a work-supporting post 50 having component sections 5 and 5' which are

separably secured upon and rise vertically from the bed-plate. The post-section 5 supports the loop-taker mechanism and the post 5' the wheel-feed mechanism of the machine.

Journalled in the bracket-arm 3 is a rotary main-shaft 6 carrying at one end a belt-pulley 7 and at its opposite end a crank-disk 8 connected by means of a link 9 with a needle-bar 10 carrying at its lower end a needle 11, which is preferably inclined slightly to the path of reciprocation of the needle-bar. The needle-bar 10 is journalled for endwise reciprocation in vertically alined bearings provided in a swinging frame 12 fulcrumed at its upper end upon a pivot-pin 13, disposed substantially parallel with the main-shaft 6 and suitably fixed by a screw 14 in the bracket-arm head 4.

To impart work-feeding movements to the needle, the needle-bar frame 12 is operatively connected with a crank-arm 15 on one end of a horizontally disposed rock-shaft 16 journalled in the bracket-arm 3 below and in substantially parallel relationship with the main-shaft 6. Secured upon the other end of the rock-shaft 16 is a forked arm 17 straddling a suitably adjustable actuating eccentric 18 upon the main-shaft 6.

Adjacent to the eccentric 18, the main-shaft 6 carries a bevel-gear 19 in mesh with a bevel-gear 20 upon the upper end of a vertically disposed intermediate shaft 21 journalled for rotation in suitable bearings provided within the bracket-arm 3 and upon the bed-plate 1. At its lower end, the shaft 21 carries a bevel-gear 22 driving a similar gear 23 upon the rearward end of a loop-taker actuating shaft 24 journalled in bearings below the bed-plate 1. At its opposite end, the shaft 24 carries a bevel-gear 25 in mesh with a bevel-gear 26 of one-half the size of gear 25 and carried by the lower end of a loop-taker shaft 27 journalled for rotation in vertically alined bearing apertures provided in lugs 28 at the inner side of the work-supporting post-section 5. Above the upper lug 28, the shaft 27 carries a thread-mass containing loop-taker 29 of the vertical-axis hook type, adapted to cooperate with the needle in the formation of lock-stitches, it being un-

derstood that the loop-taker performs two rotations for each complete reciprocation of the needle.

Above the bevel-gear 22, the intermediate shaft 21 also carries a worm 30 driving a worm-gear 31 fixed upon the rearward end of a horizontally disposed shaft 32. The shaft 32 is journaled at one end in a bushing 33 of a combination bearing-box and gear-casing 34, suitably secured upon the under side of the bed-plate 1 and also affording a bearing for one end of the shaft 24. Adjacent its opposite end, the shaft 32 is journaled in a bushing 35 suitably fixed in a supporting bracket 36 secured by screws 37 and dowel-pins 38 upon lugs 39 depending from the bed-plate 1. Secured by a key 40 upon the shaft 32 for rotation therewith are three adjacent driving gears 41, 42 and 43 of different sizes, said gears being retained upon the shaft by a washer 44 engaged by a nut 45 threaded upon the reduced end of the shaft. The driving gears 41, 42 and 43 are constantly in mesh with three driven gears 46, 47 and 48 freely journaled upon a stub-shaft 49, parallel to the shaft 32 and journaled for rotation in a bushing 50 fixed in a suitable aperture in the bracket 36. The driven gears 46, 47 and 48 are spaced from each other by washers 51 and are held against movement endwise of the stub-shaft 49 by a split-collar 52 suitably clamped upon said stub-shaft. Extending lengthwise of the stub-shaft 49 is a slot 53 in which is shiftably disposed a key 54 having a nose 55 adapted to enter any one of notches 56 in the shaft apertures of said driven gears. The key 54 is acted upon by a spring 57 to urge the key-nose 55 into said notches, the washers 51 serving to disengage the key-nose from one gear notch before entering another of said notches, when the key 54 is shifted lengthwise of the slot 53. For conveniently shifting the key 54, there is provided a knurled shift-ring 58 slidably disposed upon the stub-shaft 49, said shift-ring carrying a stud-screw 59 of which the reduced end enters a suitable slot in the key. A pin 61 disposed near the outer end of the shaft-slot 53 serves to guard against inadvertent withdrawal of the key 54 from the shaft slot 53. It will therefore be understood that while the driven gears 46, 47 and 48 of the described change-speed gearing are rotated continuously during the operation of the machine, the stub-shaft 49 will be rotated at a speed corresponding to the speed of rotation of the particular driven gear which has been selectively coupled to the stub-shaft 49 by the key 54.

Integral with the inner end of the stub-shaft 49 is a bevel-gear 62 engaging a bevel-gear 63 at the lower end of a vertically disposed shaft-section 64 journaled in a bushing 65 suitably fixed in an upwardly directed lug 66 of the bracket 36. The shaft-section

64 is held against endwise movement in the bushing 65 by the bevel-gear 63 and by a collar 67 secured to said shaft above the bushing. The upper end of said shaft-section 64 has a transverse slot 68 slidably entered by the flattened lower end or tongue 69 of a complementary shaft-section 70 journaled in a tubular extension 71 depending from a feed-wheel bracket 72. The collar 67 also acts to prevent spreading of the slotted upper end of the shaft-section 64 under torsional driving stresses. The tubular extension 71 of the bracket 72 is adjustably secured by a set-screw 73 in a vertically apertured bearing-lug 74 upon the inner side of the post-section 5', the bracket 72 being mounted for vertical adjustment in a recessed guideway in said post-section 5'. The bottom of said guideway is constituted by a transverse wall 75 of the post-section 5' and the sides of the guideway by the parallel faces 76 and 77 of walls which are in the present instance cast integral with the wall 75, as illustrated more particularly in Fig. 4 of the drawings. It will be obvious, however, that one or more of the guideway walls might be separate from the other walls, if desired for convenience in manufacture and assembling of the mechanism. The guide-bracket 72 is confined in the post guideway by headed guide-pins 85, suitably secured in the post-section 5'.

It is to be understood that the described supporting means for the bracket 72 provides for vertical adjustment of said bracket when the set-screw 73 is released therefrom and in order to conveniently and accurately effect said vertical adjustment a threaded aperture 78 is provided in the bracket 72 to receive a vertically disposed adjusting screw 79 anchored against endwise movement in an extension of the bearing-lug 74.

The shaft-section 70 is held against endwise movement in its bearing by a collar 80 upon the lower end of said shaft-section and a bevel-gear 81 upon its upper end, said bevel-gear meshing with another bevel-gear 82 journaled for rotation upon a horizontally disposed headed stud 83 fixed in the bracket 72 by a screw 84. Secured against the hub of the bevel-gear 82, by screws 86, is a pinion 87 meshing with a spur-gear 88 rotatably journaled upon another stationary, headed stud 89 fixed by a screw 90 in the bracket 72 vertically above the shaft 83. The spur-gear 88 meshes with a pinion 91 detachably secured by screws 92 upon the outer face of a feed-wheel 93, said pinion 91 and feed-wheel 93 being together journaled upon a horizontally disposed journal-stud 94, projecting integrally from the bracket 72 at the side thereof opposite to the loop-taker 29 and vertically above the stud 89. A screw 95 threaded into the free end of the journal-stud 94 holds the feed-wheel and its attached pinion upon said journal-stud.

The feed-wheel 93, which has a serrated work-engaging periphery 96 projects through and slightly above a slot 97 in a throat-plate 98 secured by screws 99 upon the upper end of the post-section 5'. Abutting an edge of the throat-plate 98 is a slide-plate 100 removably supported by the upper end of the post-section 5 and providing convenient access to the loop-taker 29. The feed-wheel has a peripheral flange 101 directed toward the loop-taker and slidably embracing a boss or curved supporting ledge 102 which is in the present case integral with the adjustable feed-wheel bracket 72. The supporting ledge 102, while permitting free rotation of the feed-wheel, serves as an abutment sustaining the feed-wheel against the pressure of a roller-presser 103 opposed thereto, said roller-presser being carried by a bracket 104 secured upon the lower end of the usual spring-depressed presser-bar 105 journaled for vertical movements in the machine bracket-arm head 4. The throat-plate 98 is provided with a needle-aperture 106 which opens into one side of the feed-wheel slot 97, said throat-plate having on its under side a web providing a needle-guide 107 below the feed-wheel flange as more fully disclosed in the before mentioned pending patent application Serial No. 363,832. The bracket 72 is cut away on the side opposite to the feed-wheel side thereof to provide a needle-clearance slot 108, partly in the face of the support 102, and to provide a segmental recess 109 affording clearance for the loop-taker 29.

The post-section 5' has a removable cover-plate 110, bent to conform to the vertical outline of the gearing, as illustrated in section in Fig. 1 of the drawings and providing for convenient access to said gearing. As illustrated in Fig. 4 of the drawings, the opening between the post-sections 5 and 5' is closed at the front and rear walls of said post-sections by cover-plates 111 removably secured upon said sections in any preferred manner.

A modified feed-wheel and driving gearing therefor is illustrated in Figs. 9 and 10 of the drawings, in which the shaft-section 112 having a flattened tongue 113 at its lower end adapted to slidably enter the slot 68 of the lower shaft-section 64, is journaled in an elongated tubular-extension 114 of an angular bracket 115 suitably mounted for vertical adjustment in the post 5'. The shaft-section 112 is held in the bracket-extension by a collar 116 upon the lower end of said shaft-section and by a bevel-gear 117 at the upper end thereof, said gear 117 meshing with a bevel-gear 118 having its hub 119 journaled in a horizontal bearing aperture in the bracket 115. The bearing for said gear-hub 119 is preferably separable, having a removable cap 120. Secured upon the gear-hub 119 by screws 121 is a feed-wheel 122, having its inner face in sliding engagement with the

adjacent face of the bracket 115. The feed-wheel 122 has a hub 123 fitting a central aperture provided in the oppositely directed gear-hub 119 and is also provided with a serrated work-engaging periphery 124. The modified construction may be employed when it is not essential to have the length of small-compass work-support afforded by the construction previously described, the modification eliminating the necessity for the multiplicity of gears for actuating the feed-wheel.

It will be understood from the foregoing description that, during the operation of the machine, the feed-wheel 93 is continuously rotated and that work-feeding movements are imparted to the needle 11 in suitably timed relation with the speed of rotation of the feed-wheel upon adjustment of the needle-vibrating eccentric 18 in accordance with the speed of rotation of the feed-wheel, which may be selectively determined by shifting the gear-securing key 54 of the change-speed gearing.

In a construction in which a work-advancing feed-wheel engages the work directly adjacent to the path of the needle, the space between the feed-wheel and the loop-taker is necessarily restricted and particularly when employing a loop-taker of the vertical-axis hook type. The present feed-wheel supporting bracket is so designed that the feed-wheel supporting portion of the bracket is disposed in said restricted space, whereby the upper portion of the work-supporting post may have a smaller compass than would be the case if the bracket was disposed at the opposite side of the feed-wheel. Furthermore, the feed-wheel rotating gearing is also so designed as to provide for a post of small compass, the construction being nevertheless of a character to provide for convenient and accurate adjustment of the level of the feed-wheel above the throat-plate, and to firmly support the flanged feed-wheel against the thrust of the presser opposed thereto.

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

1. In a sewing machine, a work-support, stitch-forming mechanism including a reciprocatory needle, a feed-wheel projecting through said work-support adjacent to the path of the needle and having a peripheral work-engaging flange, a stationary bracket upon which said feed-wheel is rotatably journaled and having a feed-wheel supporting ledge underlying the feed-wheel flange adjacent to the path of said needle, means for rotating said feed-wheel, and a presser opposed to said feed-wheel.

2. In a sewing machine, a horizontally disposed work-support, stitch-forming mechanism including a vertically reciprocatory needle, a feed-wheel projecting through said work-support adjacent to the path of the needle and having a peripheral work-engag-

ing flange, a stationary bracket upon which said feed-wheel is rotatably journaled and having a curved feed-wheel supporting ledge underlying the feed-wheel flange adjacent to the path of said needle, supporting means for said bracket providing for vertical adjustment thereof relatively to said work-support, means for rotating said feed-wheel, and a presser opposed to said feed-wheel.

3. In a sewing machine, a work-support, a reciprocatory needle, a loop-taker disposed below the work-support for cooperation with the needle in the formation of stitches, a feed-wheel disposed adjacent to said loop-taker and having a peripheral work-engaging flange on the loop-taker side thereof, a stationary bracket having a feed-wheel supporting ledge underlying the feed-wheel flange adjacent to the path of the needle, means for rotating said feed-wheel, and a presser opposed to said feed-wheel.

4. In a sewing machine, a work-support, a reciprocatory needle, a loop-taker cooperating with the needle in the formation of stitches, a feed-wheel disposed adjacent to the loop-taker and having a peripheral work-engaging flange, a stationary curved ledge disposed within and slidably supporting said feed-wheel flange, means for rotating said feed-wheel, and a presser opposed to said feed-wheel.

5. A sewing machine having a bed-plate, a work-supporting post rising from said bed-plate, a bracket-arm overhanging the bed-plate and work-supporting post, stitch-forming mechanism including a reciprocatory needle-bar journaled upon said bracket-arm, a loop-taker journaled in said work-supporting post, a work-advancing feed-wheel rotatably journaled upon said post adjacent to said loop-taker, and a stationary bracket having a portion thereof disposed between the feed-wheel and the loop-taker providing a journal-bearing for the feed-wheel, and means for rotating said feed-wheel.

6. A sewing machine having a bed-plate, a work-supporting post rising from said bed-plate, a bracket-arm overhanging the bed-plate and work-supporting post, stitch-forming mechanism including a reciprocatory needle-carrying bar journaled upon said bracket-arm, a vertical-axis loop-taker rotatably journaled upon said work-supporting post for cooperation with the needle in the formation of stitches, a work-advancing feed-wheel disposed adjacent to said loop-taker, a bracket having a portion thereof disposed between the feed-wheel and the loop-taker providing a journal-bearing for the feed-wheel, supporting means for said bracket providing for vertical adjustment thereof upon said work-supporting post, feed-wheel driving gearing carried by said bracket, and means for actuating said driving gearing.

7. A sewing machine having a bed-plate, a

work-supporting post rising from said bed-plate having separable component sections, a bracket-arm overhanging the bed-plate, a reciprocatory needle-bar journaled upon said overhanging bracket-arm, a loop-taker journaled upon one of the component post-sections, means for actuating said loop-taker, a bracket supported for vertical adjustment upon the other of said component post-sections, a work-advancing feed-wheel rotatably journaled upon said bracket, and means for rotating said feed-wheel including change-speed gearing comprising constantly intermeshing driving and driven gears, and a shiftable key for selectively establishing a driving relationship between said gears.

8. A sewing machine having a bed-plate, a work-supporting post rising from said bed-plate having separable component sections, a bracket-arm overhanging the bed-plate, a needle-carrying bar journaled upon said bracket-arm, means for imparting endwise reciprocatory and lateral work-feeding movements to said needle-bar, a vertical-axis loop-taker journaled upon one of the component post-sections for cooperation with a needle carried by said bar in the formation of stitches, means for rotating said loop-taker, a bracket adjustably mounted upon the other of said component post-sections, a work-advancing feed-wheel rotatably journaled upon said bracket, means for rotating said feed-wheel to continuously feed the work during the operation of the machine, a throat-plate secured upon the feed-wheel post-section and having a feed-wheel slot, and a removable plate covering the upper end of the other post-section in an abutting relationship with said throat-plate.

9. A sewing machine having an upstanding work-supporting post, a throat-plate upon the upper end of said post, a work-advancing feed-wheel projecting through said throat-plate, a bracket mounted for vertical adjustment upon said post providing a journal-bearing for said feed-wheel, feed-wheel driving means including a vertically disposed driven shaft-section rotatably journaled and fixed against endwise movement upon said bracket, a complementary driving shaft-section having a driving connection with the driven shaft-section maintained in different vertically adjusted positions of said bracket, and means for rotating said driving shaft-section.

10. A sewing machine having a work-supporting post provided with a vertically directed guideway and a vertically apertured bearing-lug, a bracket slidably mounted in said guideway and having a depending tubular extension disposed in the bearing-lug aperture, a work-advancing feed-wheel rotatably journaled upon said bracket, driving gearing for said feed-wheel including a shaft journaled in said tubular extension of the

bracket, means for vertically adjusting said bracket in its guideway, and means for securing said bracket in different vertically adjusted positions thereof in its guideway.

5 11. A sewing machine having a work-supporting post provided with a vertically directed guideway and a vertically apertured bearing-lug, a bracket slidably mounted in said guideway and having a laterally offset, depending tubular extension disposed in the
10 bearing-lug aperture, a work-advancing feed-wheel rotatably journaled upon said bracket, driving gearing for said feed-wheel including a shaft journaled in said tubular extension of the bracket, and a bracket-adjusting screw for effecting vertical adjustment of said bracket in its guideway.

12. A sewing machine having a work-supporting post provided with a vertically directed guideway, a rotatable feed-wheel and
20 a bevel-gear detachably secured together and having oppositely-directed coaxially-embracing hubs, a bracket slidably mounted for vertical adjustment in said guideway and provided with a separable journal-bearing for
25 the combined feed-wheel and bevel-gear, a vertically disposed shaft journaled in said bracket, a bevel-gear carried by the upper end of said shaft, and means for rotating said shaft.

30 13. A sewing machine having an upstanding work-supporting post, a bracket-arm overhanging said post, a reciprocatory needle-carrying bar journaled upon said
35 bracket-arm, a vertical-axis loop-taker rotatably journaled upon said post, a feed-wheel bracket adjustably mounted upon said post having in one side thereof a segmental loop-taker clearance recess and upon its opposite side a bearing-stud, a feed-wheel
40 rotatably journaled upon said bearing-stud, a pinion carried by the feed-wheel at its side opposite to the loop-taker side thereof, a spur-gear journaled upon said bracket vertically
45 below the axis of the feed-wheel for driving said pinion, and means for rotating said spur-gear.

In testimony whereof we have signed our names to this specification.

50 WILLIAM C. VAN NESS.
FREDERIC M. CARD.