March 6, 1951 F. W. BECK ET AL 2,544,549

TOP FEED AND PRESSER MEANS FOR SEWING MACHINES

Filed Dec. 30, 1949 5 Sheets-Sheet 1

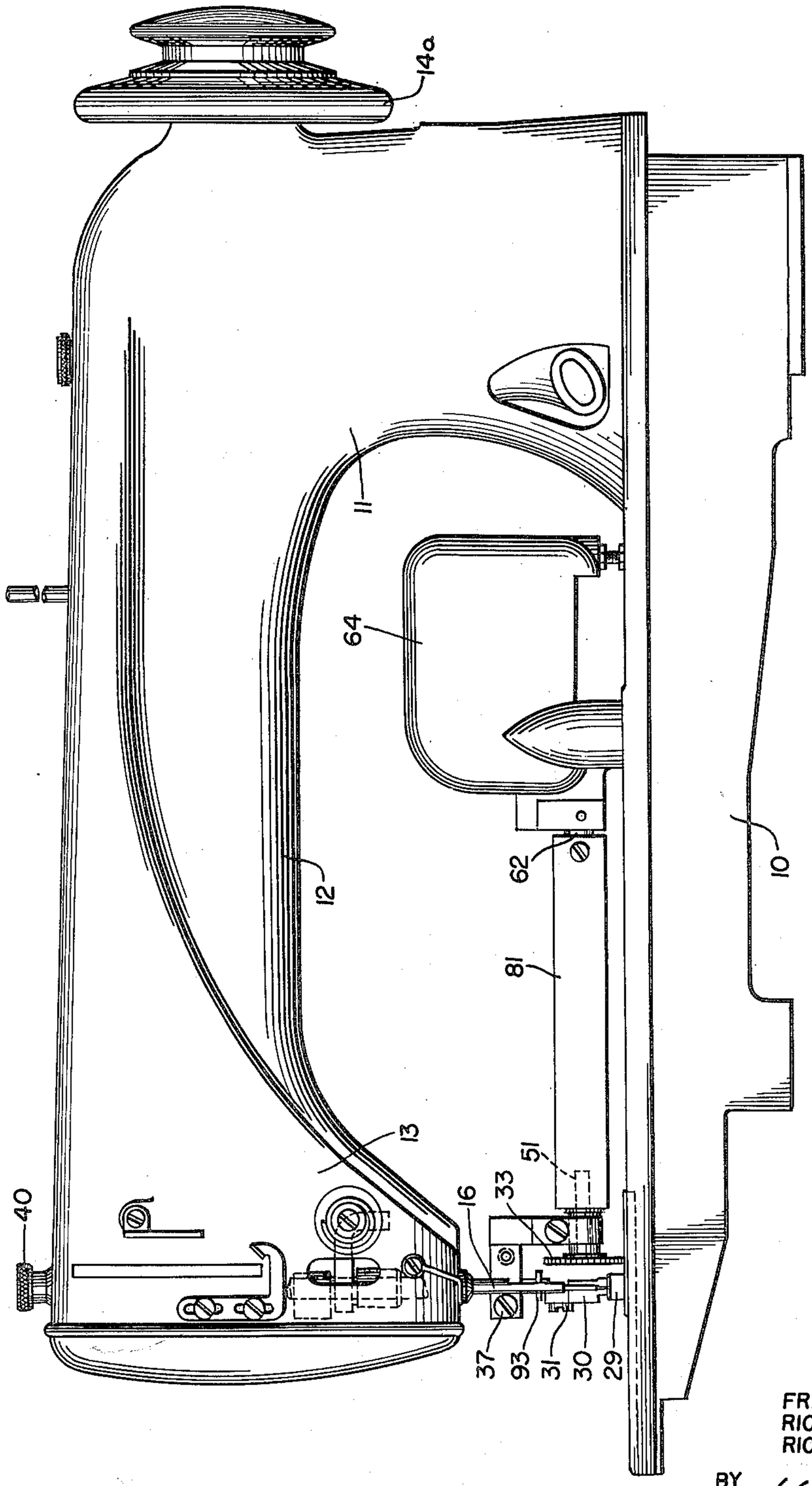

FIG. 1

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TOP FEED AND PRESSER MEANS FOR SEWING MACHINES

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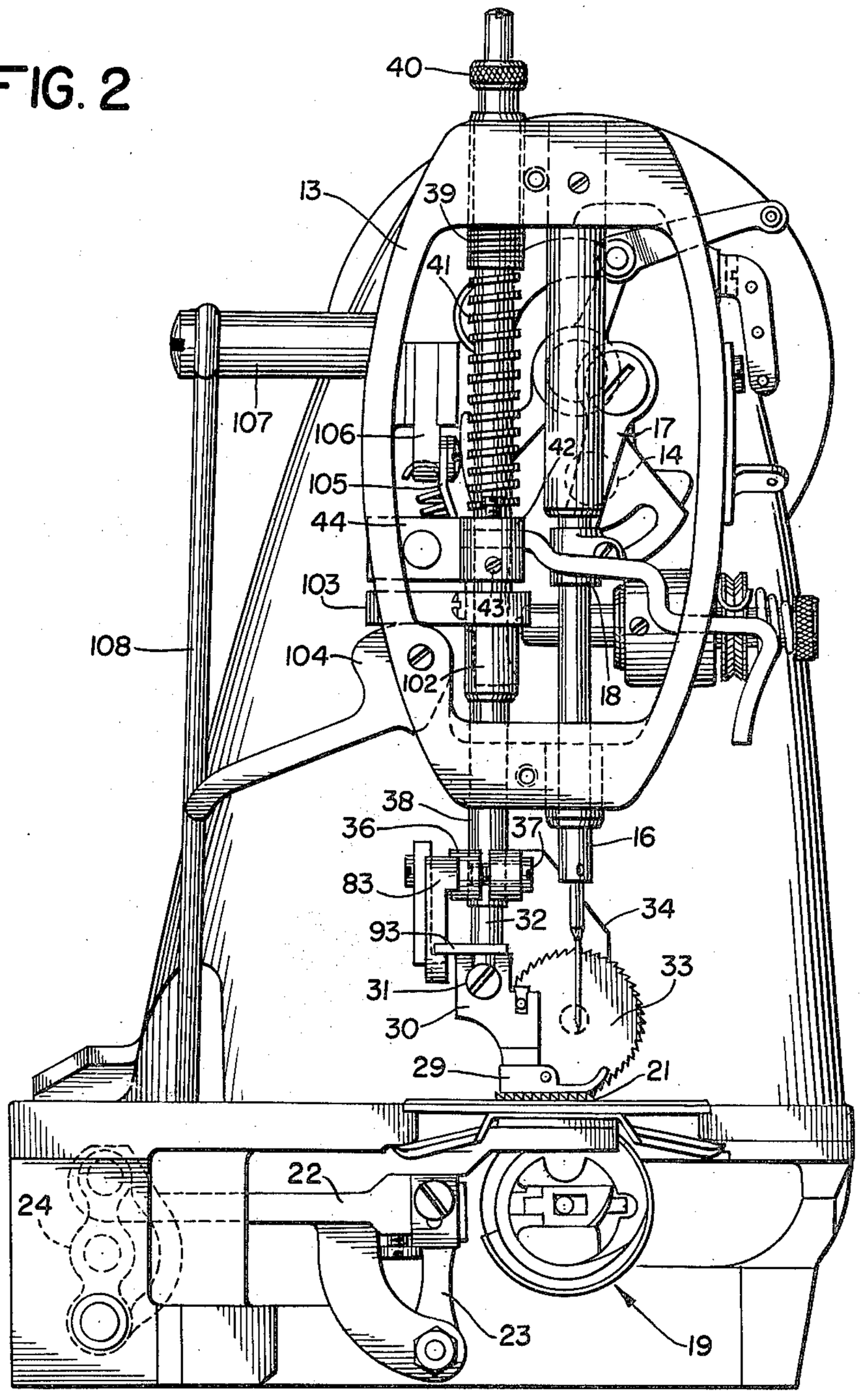
FIG. 2



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TOP FEED AND PRESSER MEANS FOR SEWING MACHINES

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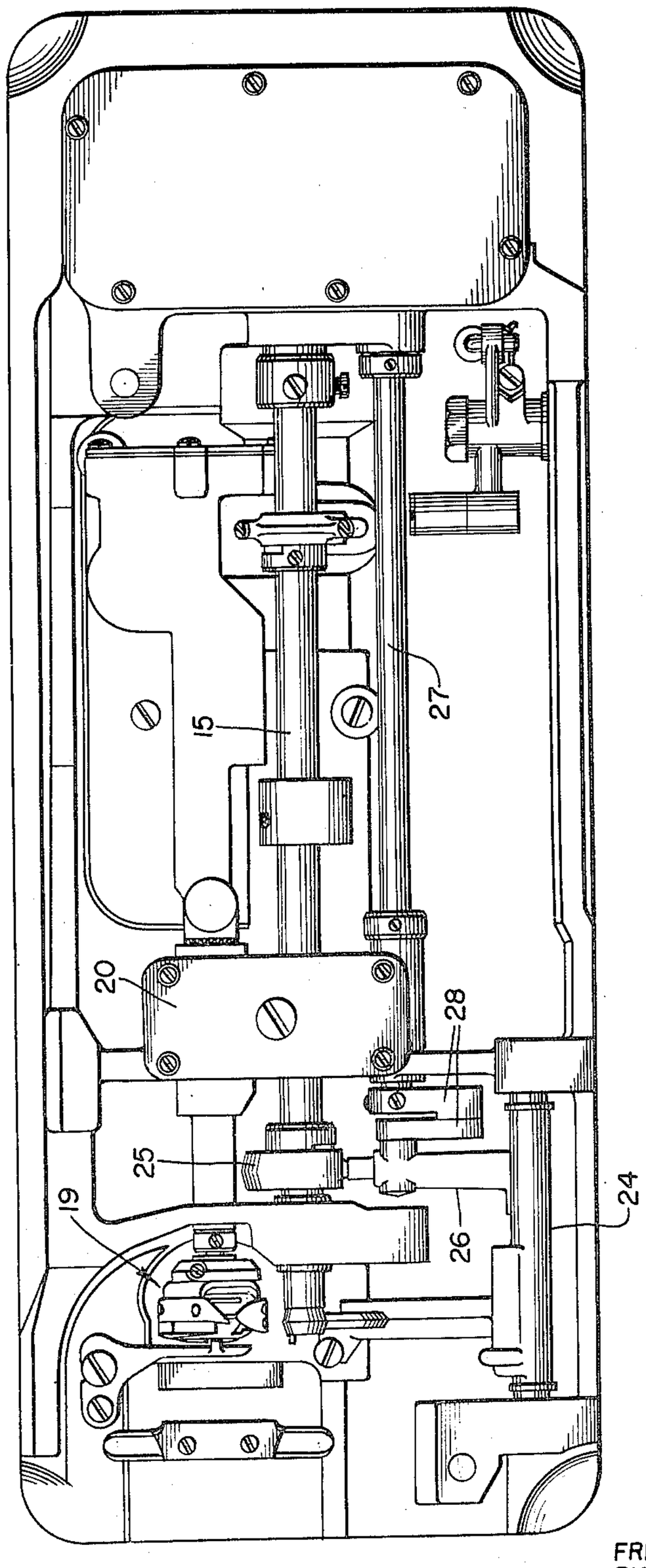
FIG. 3



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TOP FEED AND PRESSER MEANS FOR SEWING MACHINES

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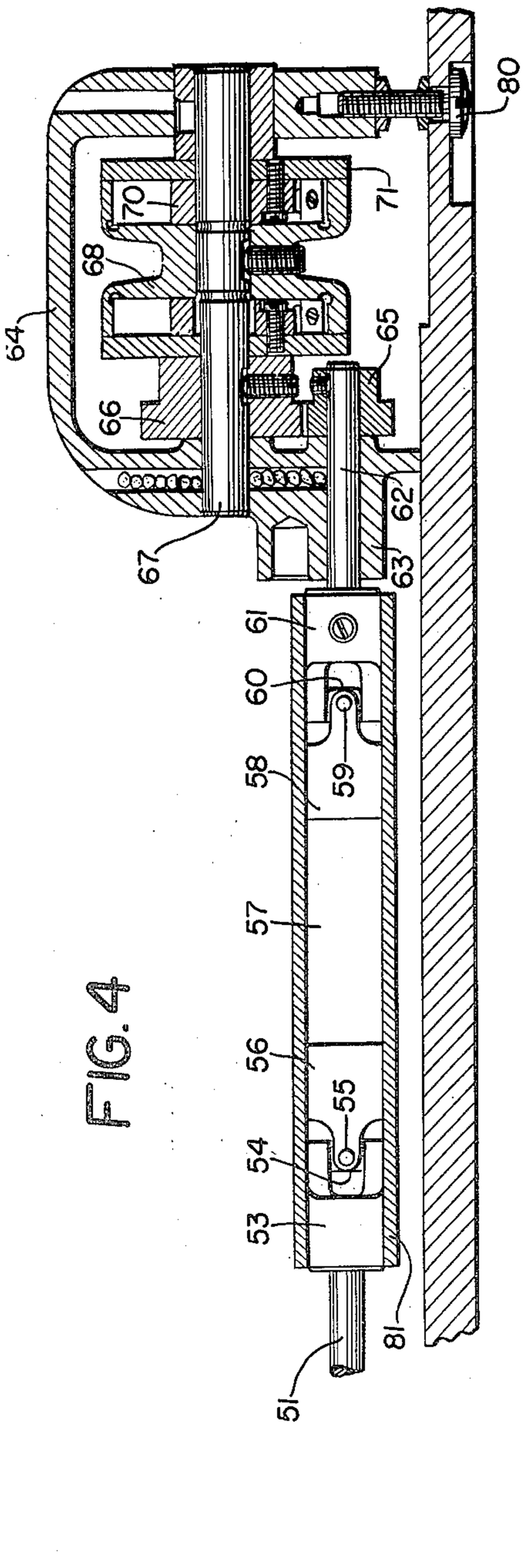

FIG. 4

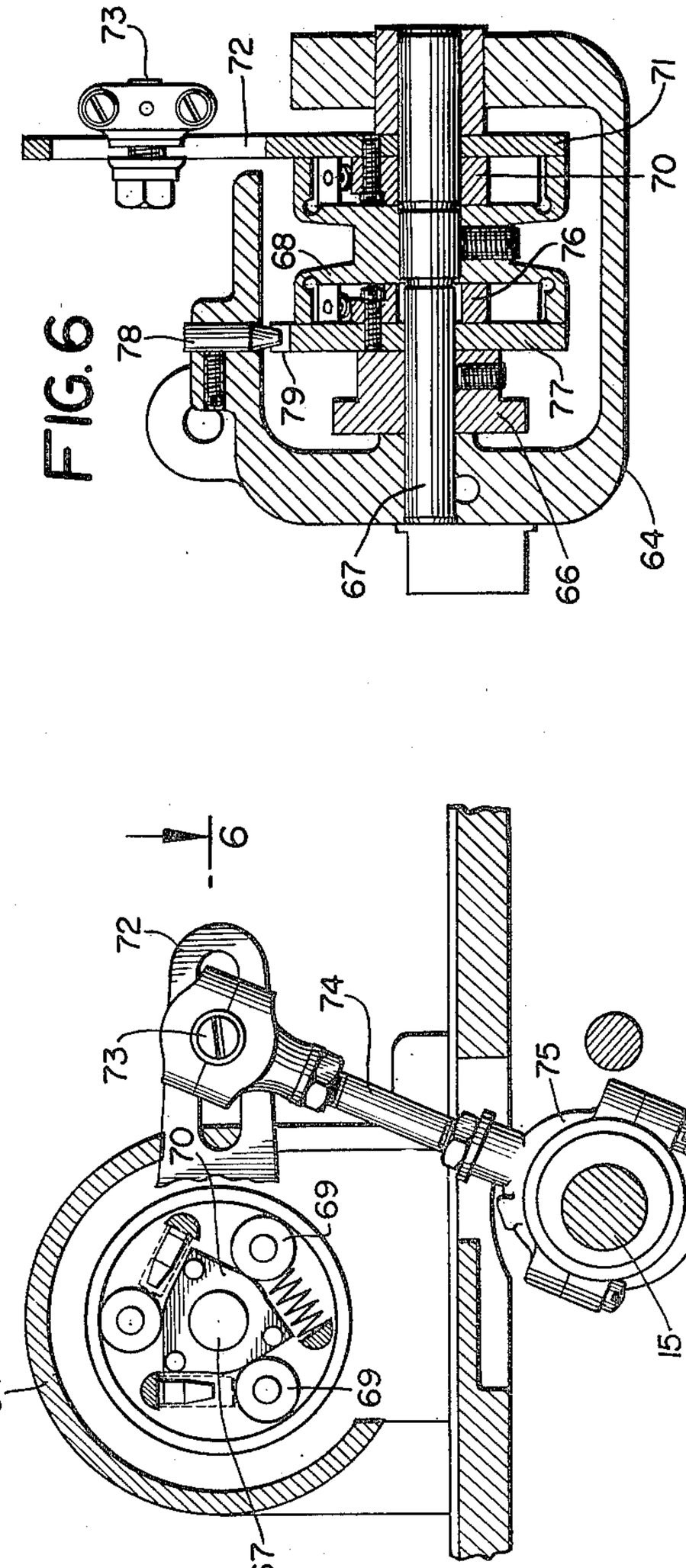

FIG. 6

FIG. 5

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TOP FEED AND PRESSER MEANS FOR SEWING MACHINES

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FIG. 7

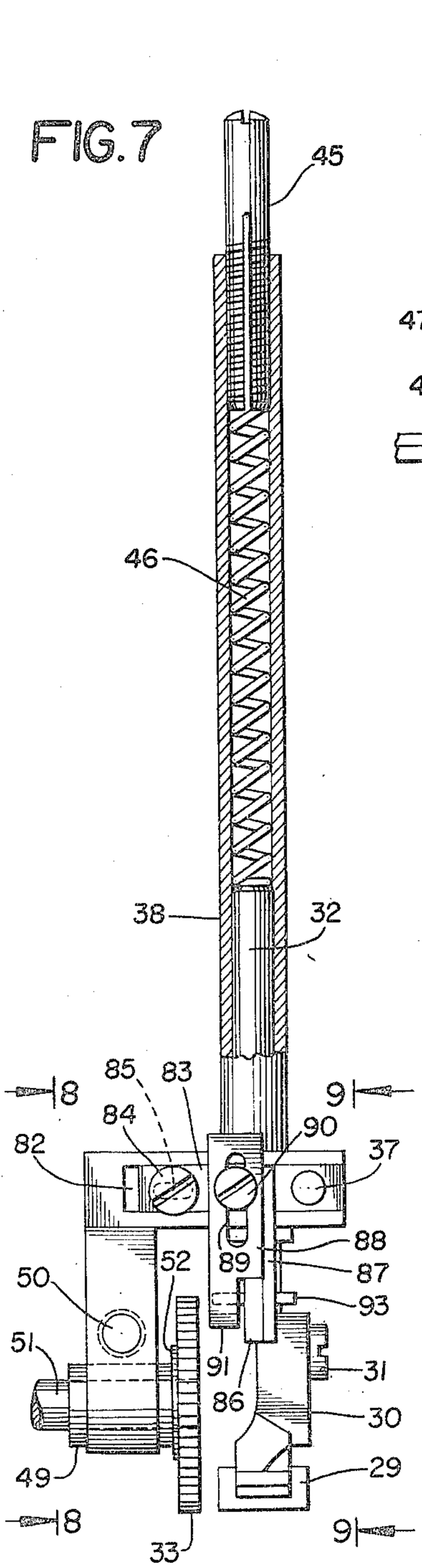


FIG. 8

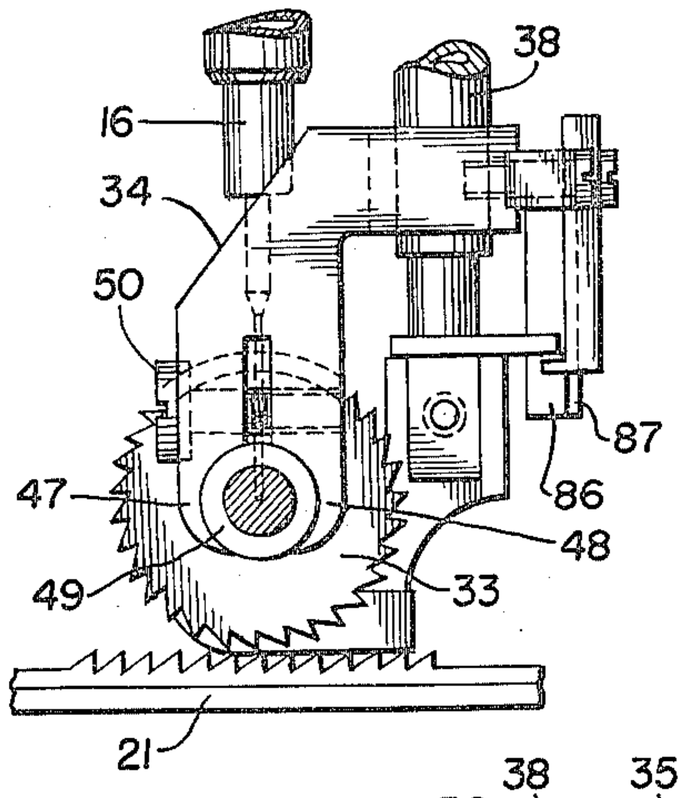


FIG. 9

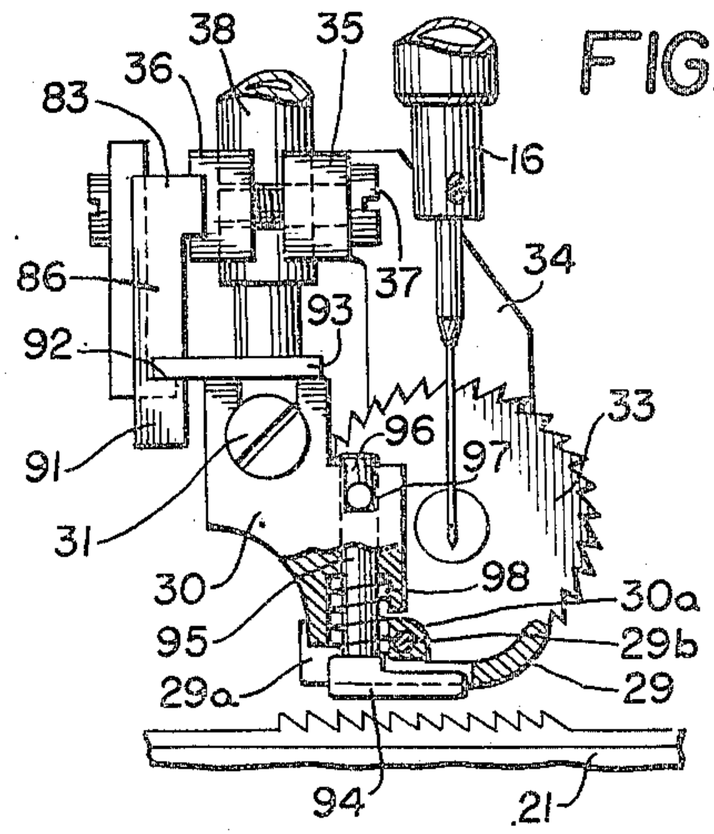
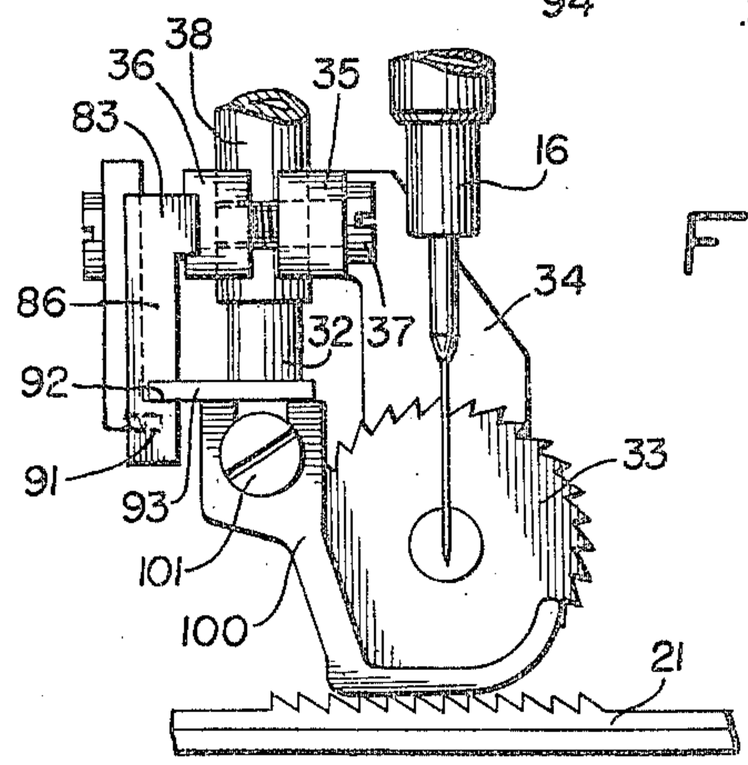


FIG. 10



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Patented Mar. 6, 1951

2,544,549

UNITED STATES PATENT OFFICE

2,544,549

TOP FEED AND PRESSER MEANS FOR SEWING MACHINES

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Application December 30, 1949 Serial No. 135,968

12 Claims. (Cl. 112—214)

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This invention relates to a top roller feed mechanism and associated presser foot mounting for sewing machines. More particularly it relates to an arrangement in which a driven feed roller is provided as an auxiliary feeding means for a portion of the work being fed by the action of a four motion feed dog. It is especially suited for the handling of work which presents an extra thickness of material in a portion being fed past the stitching point, as in the stitching down of waist band curtains on pants, run stitching and top stitching of collars and cuffs on shirts, attaching collar bands to the collars of shirts, and the like. The invention may, however, be used advantageously for other purposes.

A primary object of the invention has been to provide presser means and top feeding means which are of simple and inexpensive construction but reliable in their operations and which will insure proper and uniform feeding of work involving different thicknesses of material in different regions.

One feature of the invention is an improved mounting for a top feed roller and a presser foot, by which each is capable of independent upward and downward movement in riding over work of different thicknesses. The construction is such that lateral adjustment of the presser means in relation to the roller feed means is readily effected. This may be used, for example, to eliminate the necessity of fine tolerances in the formation of the parts and to permit easy compensation for wear of the parts.

Another feature of the invention is the provision of simple but effective means for preventing relative turning between independently slidable members which support the roller feed means and the presser means and for maintaining these parts in proper alinement with the direction of seam formation.

A further feature of the invention is the provision of simple and readily adjustable means for limiting the relative bodily movement between the roller feed means and the presser means, whereby the desired independent bodily movement of these parts is permitted and their bodily movement in unison is brought about after a predetermined extent of independent movement.

Still another feature of the invention is the provision of simple but effective means for applying spring pressures of different magnitude to a plurality of presser members and a roller feed member, the arrangement being such that the effect of the several pressure applying means may be progressively exerted upon one of the members

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after the latter has partaken of different extents of movement in relation to another of the members.

In attaining the foregoing objects and advantages the invention contemplates the provision of a unitary assembly in which roller feed means and one or more presser members are separately assembled, the presser member or members being connected with a rod or bar which is concentric with, and preferably telescoped with, a presser bar which carries the feed roller.

Other objects, advantages, and features of the invention will appear from the detailed description of an illustrative form of the invention which will now be given in conjunction with the accompanying drawings in which:

Fig. 1 is a front elevational view of a machine embodying the invention;

Fig. 2 is an end elevational view of the machine, as seen from the left in Fig. 1, with the cover plate for the needle head removed;

Fig. 3 is a bottom plan view of the machine;

Fig. 4 is a detail view in vertical section through the driving means for the top feed roller;

Fig. 5 is a detail view in transverse vertical section through a portion of the roller driving mechanism;

Fig. 6 is a horizontal sectional view along the line 6—6 of Fig. 5;

Fig. 7 is a detail view, partly in elevation and partly in vertical section, showing the unitary assembly including a top roller feed means and presser means together with supporting and retaining means therefor;

Fig. 8 is a detail view, in side elevation, of a portion of the parts shown in Fig. 7 and is taken along the line 8—8 of Fig. 7;

Fig. 9 is a similar elevational view taken in the opposite direction, along the line 9—9 of Fig. 7, a portion of the presser foot being broken away to illustrate a detail of the construction; and

Fig. 10 is a view similar to Fig. 9 showing a modified form of presser foot which may be employed.

Referring now to the drawings, the invention has been shown applied to lockstitch machine of the type disclosed in the patent to Sauer et al., No. 2,035,508, granted March 31, 1936, and the patent to Christensen et al., No. 2,113,572, granted April 12, 1938. It embodies a frame having a base portion 10, a vertical standard 11, rising from one end of the base, an overhanging arm 12, extending laterally from the upper end of the vertical standard, and a needle head 13 provided

at the free end of the overhanging arm. As disclosed in said Sauer et al. and Christensen et al. patents the machine is provided with two main rotary shafts 14 (Fig. 2) and 15 (Fig. 3) extending longitudinally of the overhanging arm and of the base, respectively. These shafts are interconnected by suitable gearing or the like (not shown) within the standard 11. The upper main shaft is arranged to be driven from any suitable source through a combined hand-wheel and pulley 14a mounted on the outer end thereof. Within the needle head there is mounted, for vertical reciprocation, a needle bar 16 arranged to be driven by a crank, carried by the upper main shaft, through a link 17 connected with a collar 18 secured to the needle bar. Cooperating with the needle in stitch formation is a rotary hook 19 which, as explained in said Sauer et al. and Christensen et al. patents, has a rotary component adapted to be rotated at twice the angular speed of the main shaft 15 of the machine, through suitable gearing in a housing 20. Means, of any appropriate character, are provided for feeding the work in the course of stitch formation. The primary work feeding means is preferably a four-motion feed dog 21 (Fig. 2) mounted on a feed bar 22 adapted to be lifted and lowered by means of an eccentric, at the end of the shaft 15, cooperating with a strap portion of a link 23 connected with a downwardly extending arm of the feed bar. The latter is rockably mounted on a feed rocker 24 (Figs. 2 and 3) arranged to be rocked by an eccentric on the shaft 15 cooperating with a strap 25 of a telescoping pitman 26, connected at its opposite end with the feed rocker. Feed and return movements are imparted to the feed dog through these connections, in the manner more fully explained in the Sauer et al. patent above mentioned. Means are also provided for adjusting the length of the feed stroke in accordance with the disclosure of said patent, such means including an adjustable rock shaft 27 connected with the pitman 26 through a pair of arms 28. For further explanation as to the construction and operation of the foregoing parts of the machine, reference may be had to said Sauer et al. and Christensen et al. patents.

Cooperating with the work on the upper side, to assist the action of the feed dog in advancing the work, is a presser foot 29 (Figs. 1, 2, 7 and 9) pivotally mounted, in a manner to be explained, on a shank 30 secured by a set-screw 31 to the lower end of a vertically disposed and slidable rod 32. Also cooperating with the work above the feed dog, adjacent the presser foot 29 and at one side thereof, is a feed wheel 33 mounted for rotation in a yoke 34 having forked extensions 35 and 36 arranged to be clamped together by a screw 37 about the lower end of a hollow presser bar 38. The latter surrounds and serves to guide the up and down movements of the rod 32. Presser bar 38 is mounted for vertical sliding movement in suitable bearings carried by the needle head 13. The upper bearing is preferably in the form of a screw threaded sleeve 39 adapted to be rotated, through a knurled head 40, to adjust its vertical position in relation to the top of the needle head. A spring 41 surrounding the presser bar is compressed between the lower end of the sleeve 39 and a collar 42 secured, by a set screw 43, to the presser bar. Spring 41 thus serves to urge the presser bar downwardly under a spring pressure determined by the adjustment of the sleeve 39. A lateral extension 44 of the collar 43 cooperates with a

slot in the rear wall of the needle head to prevent turning of the needle bar in a manner well known. A screw threaded plug 45, cooperating with internal threads at the upper end of the presser bar, may be adjusted to any desired vertical position in relation to the bar to vary the tension of a spring 46 within the presser bar. This spring is compressed between the lower end of the plug and the top of the rod 32 and thus serves to urge the rod and the connected presser foot downwardly under a pressure determined by the adjustment of plug 45, regardless of the pressure exerted by the spring 41. It should be understood, however, that the force applied by spring 41 is substantially greater than that applied by the spring 46.

For supporting the feed wheel 33, the yoke 34 has a forked lower end providing branches 47 and 48 adapted to receive and clamp a bearing sleeve 49. A screw 50 is provided to impart the desired clamping force to the extensions 47 and 48. A shaft 51, journaled in the bearing 49, has an enlarged head 52 to which is secured the feed wheel 33 in any suitable manner. At its opposite end the shaft 51 carries a member 53 (Fig. 4) forming part of a universal coupling. A stud 54 is rockably mounted in spaced arms of the member 53 and is connected by a pin 55 with a complemental member 56 of the universal coupling. Member 56 is formed integral with, or otherwise connected with, a shaft extension 57 which carries a similar universal coupling member 58 at its opposite end. The latter is pivotally connected by means of a pin 59 with a stud 60 rockably mounted in spaced arms of another complemental member 61 of the universal coupling. Member 61 is secured to a shaft 62 mounted in a bearing extension 63 of a clutch housing 64. Within the clutch housing, the shaft 62 has secured thereto a pinion 65 which meshes with a gear 66 secured to a shaft 67 journaled in the housing. Intermediate its ends, the shaft 67 has secured thereto a clutch sleeve 68 having a cup shaped portion arranged to receive driving rollers 69 of a one-way clutch unit. These rollers cooperate with a plate 70 secured to a disc 71 rockably mounted on the shaft 67. A laterally extending arm 72 of the disc has an elongated slot to receive, adjustably, a ball pin 73 connected by a pitman 74 with an eccentric on the shaft 15. Pitman 74 has a strap portion 75 surrounding the eccentric. It will be apparent that upon rotation of the shaft 15, the arm 72, and hence the disc 71 and plate 70, will be oscillated through an angular distance which may be varied by clamping the pin 73 at any desired point along the elongated slot. As will be understood, the movement of the parts in one direction will impart a corresponding movement to the sleeve 68 through the rollers 69. Movement of the sleeve in the opposite direction is prevented by rollers similar to the rollers 69 cooperating with the inner surface of another cup-like portion of the sleeve 68 and with a plate 76, similar to the plate 70. Plate 76 is secured to a disc 77 which is held against rotation by engagement of a pin 78, fixedly mounted in the housing 64, with a notch 79 in the periphery of the disc.

Housing 64 may be secured to the upper or work supporting surface of the base portion 10 of the frame in any suitable way, but it is preferably mounted for slight tilting movement by means of an adjusting screw 80 so that the angular position of the shaft 62 in relation to the work supporting surface of the base may

be varied slightly. The universal coupling means (parts 53 to 61 inclusive) are preferably enclosed by a sleeve 81. This may suitably be formed of a flexible and stretchable material, such as rubber or a suitable plastic, so as to closely surround the parts without, however, interfering with the necessary relative angular movement of the parts. It may, however, be formed of metal, if desired, in which case adequate clearance must be provided, in relation to the enclosed coupling parts, to permit the necessary relative angular movements.

Yoke 34 is provided with a horizontally extending guide channel or groove 82 in its rearwardly facing surface, to receive and guide the inner end of a horizontally extending arm 83 of an angle member. Arm 83 may be adjusted along the channel 82 to any desired position, within suitable limits, and then clamped in set position by a screw 84 which passes through an elongated or enlarged opening 85 in the arm 83 and is threaded into a hole in the yoke 34. A vertically disposed arm 86 of the angle member is rabbeted to provide a guide ridge or flange 87 arranged to cooperate with one edge of a vertically adjustable member 88. The latter is provided with an elongated slot 89 arranged to receive a screw 90, the inner end of which is threaded into a hole in the arm 83. Member 88 has an inwardly bent finger 91 at its lower end arranged to underlie one of the forked end portions 92 of a member 93 formed integral with, or otherwise secured to, the rod 32. The forked extensions 92 cooperate with the opposite faces of the arm 86 to prevent turning of the rod 32 while permitting up and down movement of the latter. Finger 91 cooperates with the forked extension 92 to limit the downward movement of the rod 32 in relation to presser bar 38 when the latter is lifted from the work in the manner to be explained. The extent of this downward relative movement may be adjusted, to suit the particular requirements of the work, by raising or lowering the position of the member 88 on the arm 83. It may also be varied by changing the vertical position of the yoke 34 in relation to the presser bar 38. The horizontal adjustment of the arm 83 in the channel 82 eliminates the necessity of extreme tolerances in the formation of the parts. It also permits take-up for wear. Moreover, the separate formation of the angle member allows it to be readily replaced when worn excessively, without the necessity of discarding the entire yoke member.

Presser foot 29, as best shown in Fig. 9, has a forward, upwardly curved portion, which is solid across the width of the foot, and in rear of this it is formed with a pair of spaced vertical walls 29*a* which cooperate with opposite side faces of the yoke 30. The foot is pivotally mounted on the yoke by a pin 29*b* extending through the walls 29*a* and through a lug 30*a* in the yoke positioned between the arms 29*a*. Within the space between the walls 29*a* there is mounted a small auxiliary presser foot 94 which is carried at the lower end of a rod 95 that is slidable vertically in an opening through a portion of the yoke 30. A pin 96 extending through the rod 95, adjacent its upper end, cooperates with slots 97 in the yoke to prevent rotation of the foot 94 and to limit its downward movement, in relation to the yoke and the presser foot 29. A spring 98 surrounding the rod 95, in a socket formed in the lower portion of the yoke, urges the section 94 downwardly.

It will be apparent that when the roller feed and presser foot assembly is urged downwardly into engagement with the work the section 94 will first engage the work and will be forced upwardly, against the relatively light resistance of the spring 98, until the under surface of section 94 is flush with the under surface of the feed dog 29, or, under some circumstances, until the upper surface of section 94 engages the undersurface of the lug 30*a* of the yoke. When the presser foot 29 engages the work, it will be forced upwardly and the rod 32 will compress spring 46 until the roller 33 is finally brought into engagement with the work. The roller will then be urged against the work under the force of the spring 41, while presser foot 29 will be urged against the work by the force of the partially compressed spring 46 and section 94 will be urged against the work by the force of the spring 98. Thus, normally, three different pressures are exerted upon the work. Should some part of the work of extra thickness pass beneath the section 94 while a thinner section of the work is beneath the foot 29, so that the section 94 is brought into engagement with the lug 30*a*, the pressure exerted on section 94 will be derived from the spring 46. Moreover, it is possible, by appropriate adjustment of the yoke 34 in relation to the presser bar 38, to so reduce the relatively upward movement between the rod 32 and bar 38 that an extra thickness of work passing beneath the section 94 will cause lifting of the latter firstly to engage the shank 30 of the presser foot and lift this against the action of spring 46, and then to lift the presser bar 38 against the action of spring 41, due to engagement of the member 93 with the lower end of the presser bar. Therefore, while the feed wheel and two presser foot members or sections are normally subjected to three different pressures, it is possible, under some circumstances, to exert the pressure of the spring 41 on any one or more of these members.

One advantage of providing the independently movable section 94, with its relatively light downward pressure, is that this enables the lifting of the feed wheel and presser foot assembly, in the manner to be explained, to just a sufficient extent to raise the feed wheel and presser foot 29 from the surface of the work while section 94 still engages the work. This facilitates tacking operations and the like.

In Fig. 10 there is shown a simpler form of presser foot 100 which is of integral construction and simply attached to the lower end of the rod 32 by means of a screw 101. In other respects the modified construction of Fig. 10 may be the same as that of Figs. 7, 8 and 9.

For lifting the combined feed wheel and presser foot unit, a collar 102 is slidably mounted on the presser bar 38 (Fig. 2) this collar having a laterally extending arm 103 at its upper end adapted to be engaged by a cam formed on a hand lever 104. This hand lever will ordinarily be used only when it is desired to retain the unit elevated for a substantial period of time. For lifting the feed wheel and presser assembly momentarily in the course of operation of the machine, connections are preferably provided to a knee press or foot treadle. These may include a link 105 connected at its lower end with the collar 102 and at its upper end with the forward end of a lever 106. The latter is pivoted, intermediate its ends, within the hollow arm of the machine. At its rearward end (Fig. 2) the

lever carries a stud 107 which projects outwardly from the rear face of the overhanging arm and is connected by a rod 108 with suitable means operated by a knee press or foot treadle. For a fuller disclosure of a suitable arrangement of this character, reference may be had to the patent to Rubel No. 2,373,418, granted April 10, 1945.

When the presser bar 38 is lifted in either of the ways explained it will first raise the feed wheel from the surface of the work, or the work support while spring 46 will still keep the presser foot in engagement with the work. However, when the finger 91 engages the under surface of member 93 the rod 32 will also be lifted, upon the continued upward movement of the presser bar, to raise the presser foot from the work. In the form of the invention shown in Figs. 8 and 9, the section 94 will still engage the work as the main presser foot 29 is lifted from it but when the pin 96 reaches the bottom of the slot 97, the section 94 will be raised from the work on the continued upward movement of the bar 38.

It should be noted that the presser bar 38, rod 32, feed wheel 33, presser foot 29, section 94 and the various related parts constitute a separate assembly of simple, compact and relatively inexpensive construction. This unit may be readily applied to the needle head to provide the desired presser action and top feed on the work in the region of stitch formation. The arrangement is preferably such that the path of the needle intersects the axis of rotation of the feed wheel, and the needle passes through a suitable opening provided in or between the rearward edge of the upwardly curved portion of the main presser foot member 29 and the forward edge of the section 94. These edges of the presser foot elements may simply be notched to provide complemental parts of a suitable needle opening. As explained, the feed wheel 33 preferably overlies and coacts with a portion of the under feed-dog but, if desired, it may coact simply with the surface of the throat plate or with a special spring element or flexible tongue of the type disclosed in said patent to Kucera No. 2,265,605.

While an illustrative embodiment of the invention has been disclosed in considerable detail and several modifications have been suggested, it will be understood that other changes may be made in the construction and arrangement of the various parts, without departing from the general principles and scope of the invention.

What we claim is:

1. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, vertically movable presser means arranged to engage the upper surface of the work in opposition to said feed dog, a vertically movable feed wheel adjacent said presser means also arranged to engage the upper surface of the work, supporting means including a spring urged presser bar rigidly connected with said feed wheel for retaining the same and urging it against the work, said presser means being mounted for relative sliding movement on said supporting means, spring means reacting between said presser bar and said presser means for urging the latter against the work independently of the force applied to said presser bar, means for rotating said feed wheel intermittently, and means carried by said presser means cooperating with said supporting means

for guiding said presser means and preventing turning thereof in its movements relative to said supporting means.

2. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, vertically movable presser means arranged to engage the upper surface of the work in opposition to said feed dog, a vertically movable feed wheel adjacent said presser means also arranged to engage the upper surface of the work, supporting means including a spring urged presser bar rigidly connected with said feed wheel for retaining the same and urging it against the work, said presser means being mounted for relative sliding movement on said supporting means, spring means reacting between said presser bar and said presser means for urging the latter against the work independently of the force applied to said presser bar, means for rotating said feed wheel intermittently, a vertically disposed guide member adjustably mounted on said supporting means, and means carried by said presser means cooperating with said guide member to prevent turning of said presser means.

3. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same vertically movable presser means arranged to engage the upper surface of the work in opposition to said feed dog, a vertically movable feed wheel adjacent said presser means also arranged to engage the upper surface of the work, supporting means including a spring urged presser bar rigidly connected with said feed wheel for retaining the same and urging it against the work, said presser means being mounted for relative sliding movement on said supporting means, spring means reacting between said presser bar and said presser means for urging the latter against the work independently of the force applied to said presser bar, means for rotating said feed wheel intermittently, a vertically disposed guide member mounted for lateral adjustment on said supporting means, a stop member mounted for vertical adjustment on said supporting means, and means carried by said presser means cooperating with said guide member and said stop member for preventing turning of said presser means and limiting the movement thereof in relation to said supporting means.

4. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, a presser foot carried by said rod, and relatively adjustable means on said support and rod for preventing turning of the latter within said bar.

5. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar,

a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, adjustable means for variably limiting the downward movement of said rod, a presser foot carried by said rod, and relatively adjustable means on said support and rod for preventing turning of the latter within said bar.

6. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, a presser foot carried by said rod, and a member mounted on said support and adjustable laterally of the axis of said rod, and cooperating guide means carried by said member and rod, respectively, for preventing relative turning between said rod and bar.

7. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, a presser foot carried by said rod, and a member mounted on said support and adjustable laterally of the axis of said rod, means mounted for vertical adjustment on said member and providing a stop for variably limiting the downward movement of said rod relative to said bar, and cooperating guide means carried by said member and rod, respectively, for preventing relative turning between said rod and bar.

8. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, a presser foot shank secured to said rod, a presser foot pivotally mounted on said shank, a presser element slidably mounted on said shank, and a spring coacting between said element and shank for urging said element downwardly in relation to said shank.

9. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, a presser foot shank secured to said rod, a presser foot pivotally mounted on said shank, a presser element slidably mounted on said shank, a spring coacting between said element and shank for urging said element downwardly in relation to said shank, and stop means for limiting the downward movement of said rod in relation to said bar and of said element in relation to said shank, the relation being such that when said bar is lifted the work engaging portion of said element is lower than that of said presser foot and the work engaging portion of said presser foot is lower than that of said feed wheel.

10. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, spring means for urging said rod downwardly within said bar, a presser foot shank secured to said rod, a presser foot pivotally mounted on said shank, a presser element slidably mounted on said shank, a spring coacting between said element and shank for urging said element downwardly in relation to said shank, and stop means for limiting the downward movement of said rod in relation to said bar and of said element in relation to said shank, a part of said stop means being adjustable vertically to vary the lower limit of said rod in relation to said bar, the relation being such that when said bar is lifted the work engaging portion of said element is lower than that of said presser foot and the work engaging portion of said presser foot is lower than that of said feed wheel.

11. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, and a combined top-feed and presser unit cooperating with said feed dog, said unit comprising a hollow presser bar, a spring surrounding said bar urging said bar toward the work, means for lifting said bar away from the work, a support secured to said presser bar, a feed wheel journaled on said support, means for rotating said feed wheel intermittently, a rod slidably mounted within said bar, a spring within said bar urging said rod downwardly, means for adjusting the tension of said springs independently of each other, a presser foot carried by said rod, and adjustable means on said support for variably limiting the downward movement of said rod in relation to said bar.

12. In a sewing machine, work feeding devices comprising a four motion feed dog arranged to engage the under surface of the work and intermittently advance the same, a top feed roller and presser means arranged to engage the upper surface of the work to assist in advancing the same, a pair of concentric bars telescopically ar-

ranged in vertical position above the work, said bars being shiftable axially in relation to each other, means for mounting said feed wheel on one of said bars, means for mounting said presser means on another of said bars, means for rotating said feed wheel intemittently, separate springs for urging said bars downwardly, means for separately varying the tension of said springs, cooperating guide members carried by said bars for preventing relative rotation thereof, said guide members being adjustable laterally in relation to each other, and means for limiting relative axial movement between said bars in both directions.

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No references cited.