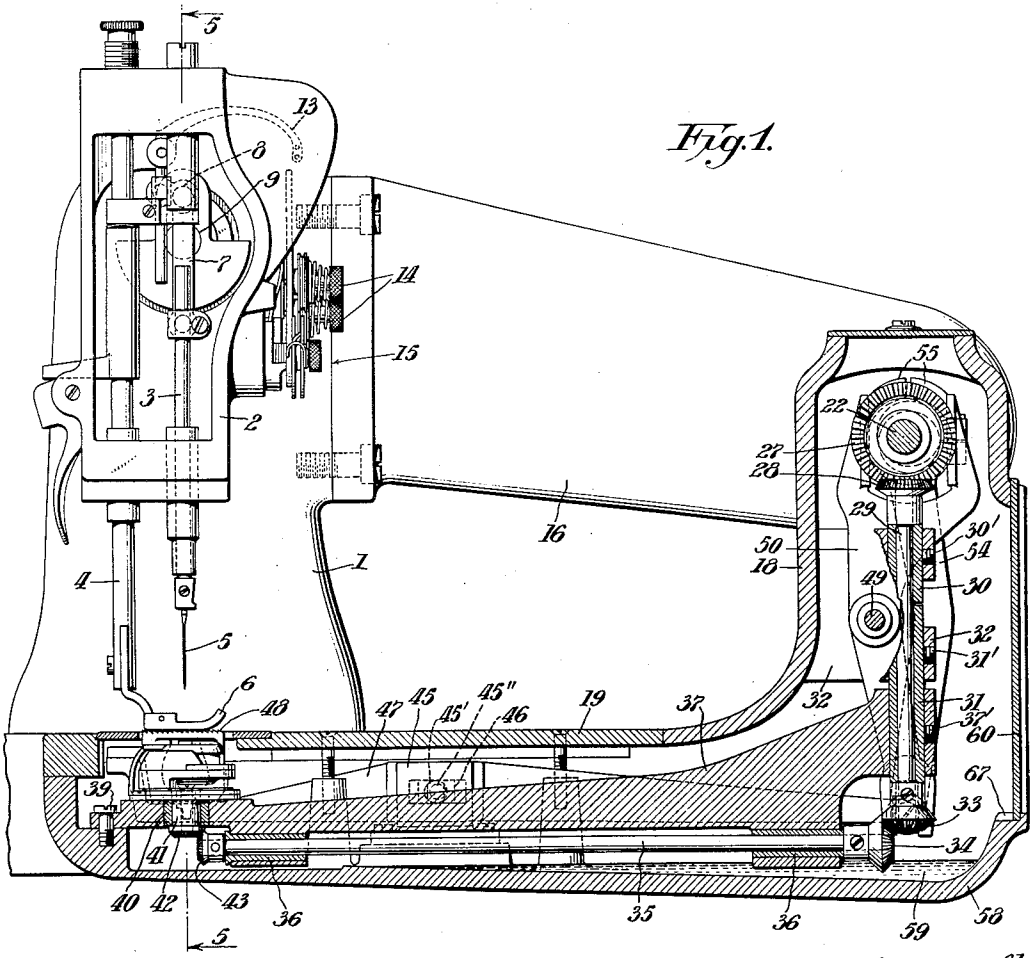
July 11, 1933. G. M. EAMES 1,917,756

FEED-OFF-ARM SEWING MACHINE

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Fig. 1.



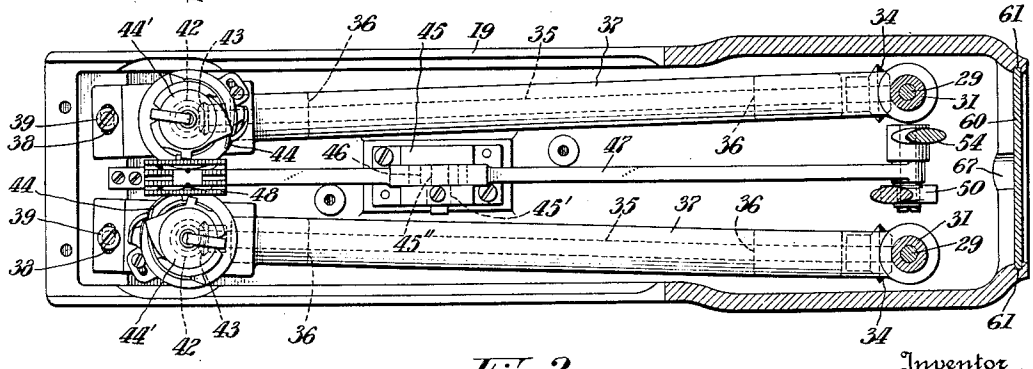


Fig. 2.

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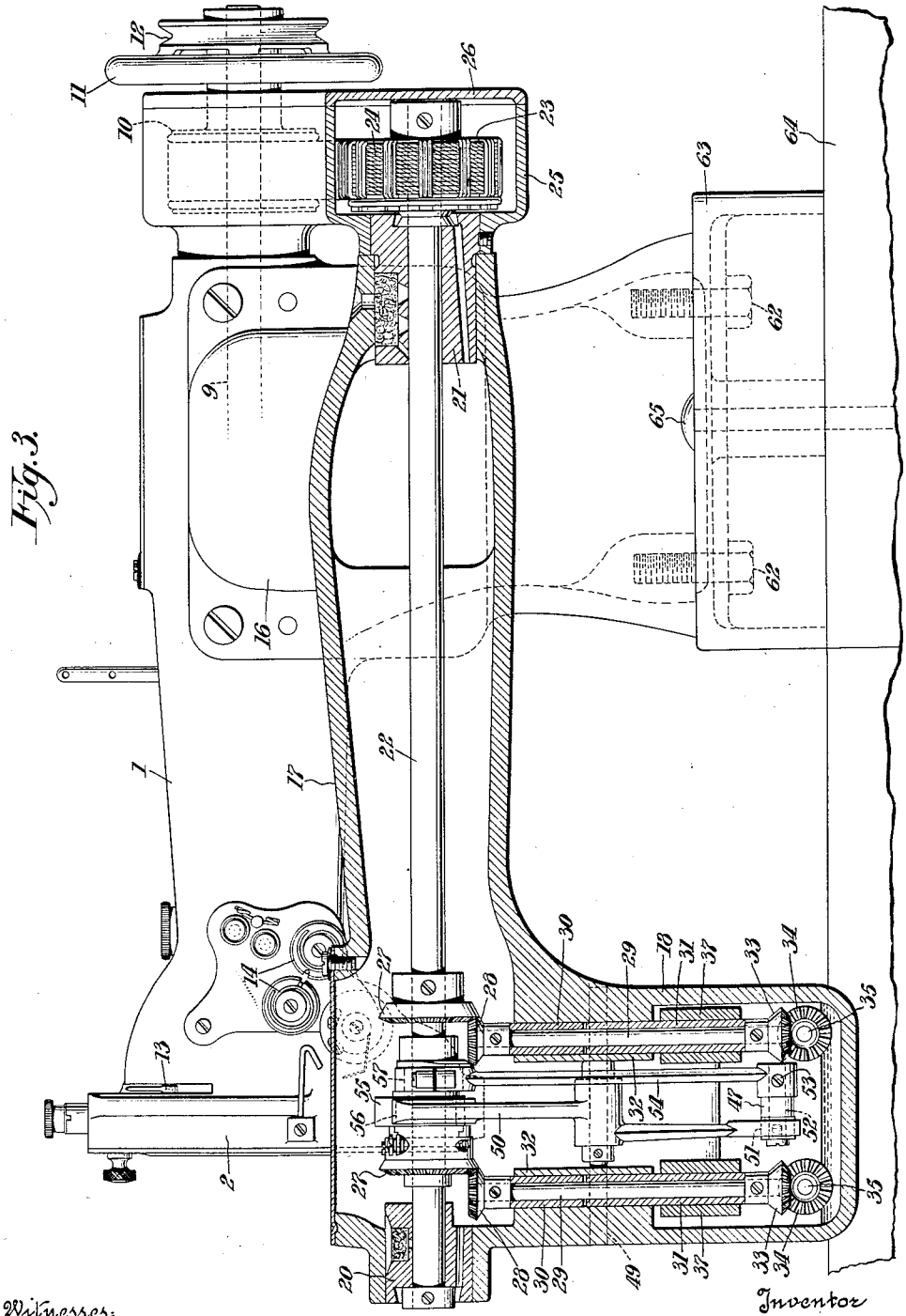
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FEED-OFF-ARM SEWING MACHINE

Filed Nov. 23, 1929 5 Sheets-Sheet 2

Fig. 3.



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FEED-OFF-ARM SEWING MACHINE

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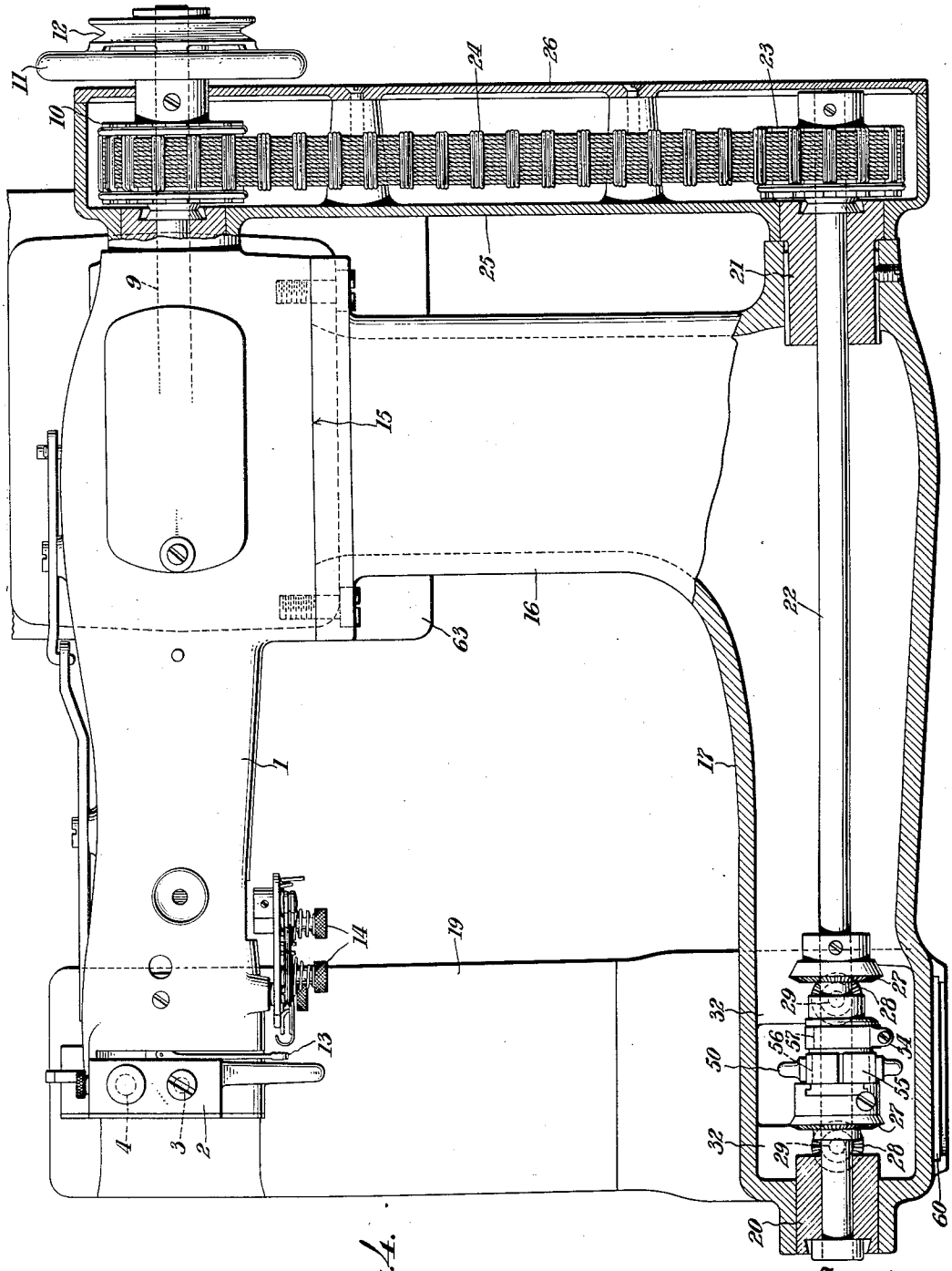


Fig. 4.

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FEED-OFF-ARM SEWING MACHINE

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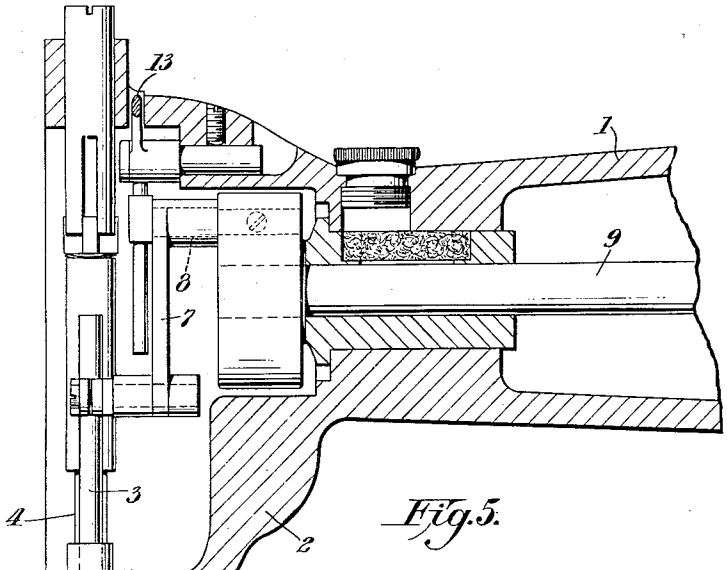
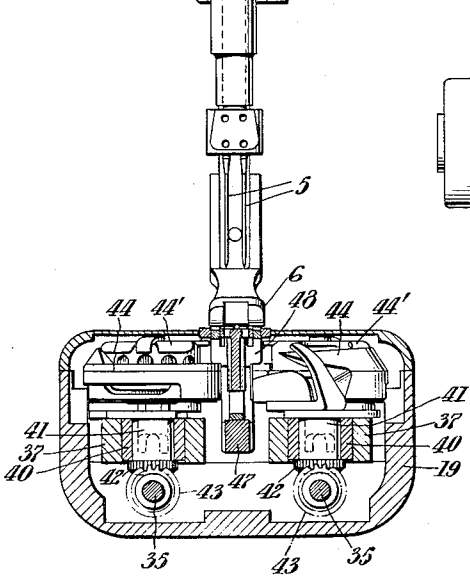


Fig. 5.



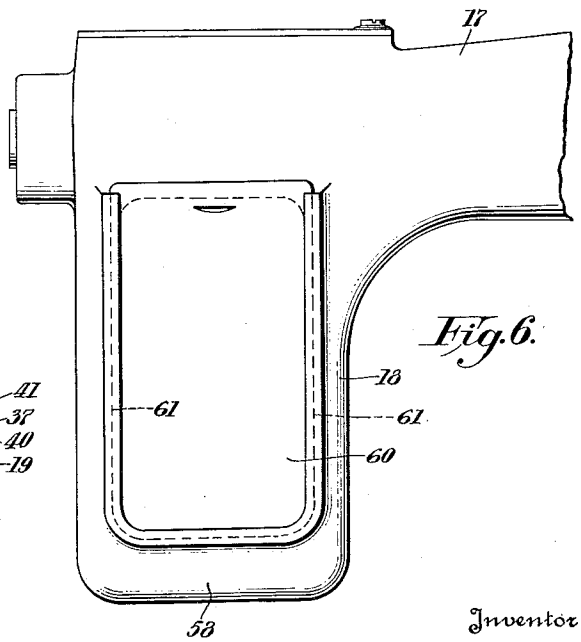


Fig. 6.

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FEED-OFF-ARM SEWING MACHINE

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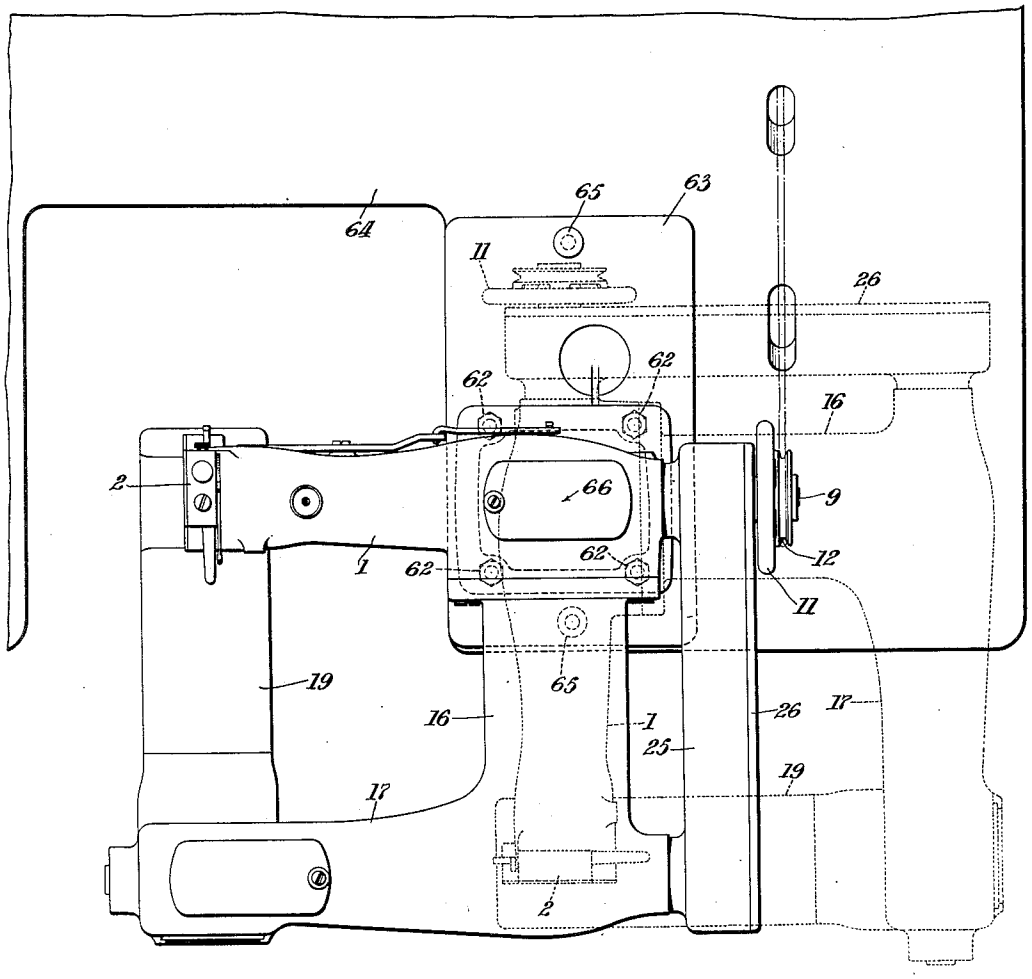


Fig. 7.

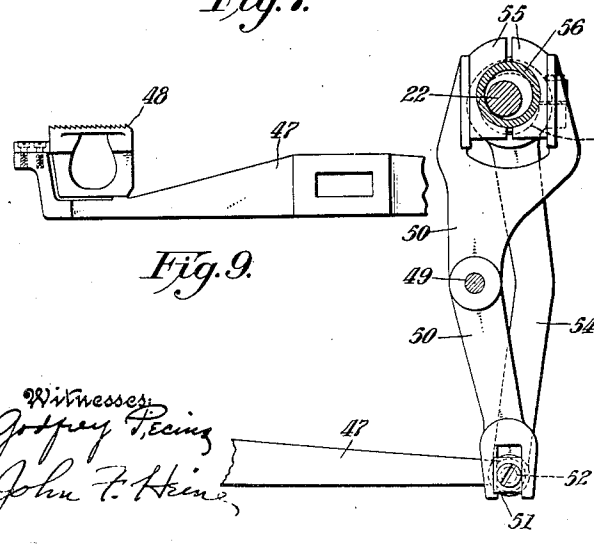


Fig. 9.

Fig. 8.

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UNITED STATES PATENT OFFICE

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FEED-OFF-ARM SEWING MACHINE

Application filed November 23, 1929. Serial No. 409,224.

This invention relates to sewing machines, more particularly to the feed-off-arm type, and has for an object to provide a machine of this type with a work-supporting arm which is so constructed as to entirely overcome the danger of oil-leakage and the soiling of work incident thereto.

Another object of the invention is to provide a feed-off-arm machine with stitch-forming mechanism of the multiple-needle lock-stitch type embodying laterally adjustable loop-taking devices and associated bobbins, with simplified provisions for effecting the drive and adjustment of the loop-takers.

A further object of the invention is to effect a simplified and efficient organization of the loop-taker and feeding mechanisms within the work-supporting arm.

Still further, the invention has for an object to provide for the adjustment of the machine on the power-table to change the angular relation of the work-supporting arm relative to the edge of the table-top.

With the above and other objects in view, as will hereinafter appear, the machine is constructed with a goose-neck the frame and mechanism of which are of standard construction with the exception of the provision of a vertical seat at the front side of the goose-neck at the bend of the latter, for attachment of the one piece arm-casting. The arm-casting comprises an upper forwardly projecting arm at the free end of which is an upper laterally extending arm carrying at its free end a vertically depending arm at the lower end of which is the work-supporting arm, proper, which extends toward and terminates below the free end of the overhanging gooseneck.

There is no mechanism within the upper forwardly projecting arm and, in the upper laterally extending arm there is no mechanism except a rotary counter-shaft which is journaled in bearings at the opposite ends of such arm and carries loop-taker and feed-actuating members between such bearings. There is no dividing wall or partition between the spaces within the laterally extending and depending arms to obstruct the flow of spent oil from both counter-shaft bearings to and downwardly through the depending arm into the oil reservoir at the bottom of the latter.

The loop-taker and feeding mechanisms are driven from the counter-shaft by connections within the vertically depending arm and work-supporting arm, proper, as will be more particularly described.

A feature of the invention is the one-piece seamless construction of the arm casting employed, eliminating the danger of oil leakage while permitting the flow of oil from any point in the arm casting into the oil well at the base of the depending arm member. A sliding window is preferably provided in the vertically depending arm to permit ready access to the interior thereof and, through this window, an oil gun may occasionally be inserted to withdraw spent oil which collects in the reservoir at the bottom of the depending and work-supporting arms, the latter preferably having a slight downward pitch toward such window.

The gooseneck is preferably secured to an iron base which may be bolted to the table-top. The means for securing the gooseneck to the base is of such a nature that, without changing the position of the base on the tabletop, the machine may be set up with the work-supporting arm in different angular relations to the edge of the table as, for example, in parallelism with or at right angles to the table-edge.

In the accompanying drawings Fig. 1 is a side elevation of a feed-off-arm sewing machine embodying the invention, the work-supporting arm being shown in longitudinal vertical section. Fig. 2 is a horizontal section through the work-supporting arm showing the arm-mechanism in plan. Fig. 3 is a front elevation of the machine with the upper laterally extending arm and depending arm in vertical section. Fig. 4 is a plan view of the machine with the upper laterally extending arm and belt-guard in horizontal section. Fig. 5 is a vertical section on the line 5—5, Fig. 1. Fig. 6 is a fragmentary front elevation of the sliding door construction through which access is gained to the interior of the vertically depending member of the frame Fig. 7 is a plan view of

a power table top with the machine stationed thereon. Fig. 8 is a detail elevation of the feed-actuating mechanism, and Fig. 9 is an elevation of the front end of the feed-bar shown in Fig. 8.

The machine, in its preferred embodiment, comprises a gooseneck 1 of standard construction having at its overhanging end the usual head 2 for the reciprocating needle-bar 3 and presser-bar 4. The needle-bar 3 carries two needles 5 arranged abreast of the line of seam-formation and the presser-bar carries the usual presser-foot 6. The needle-bar 3 is reciprocated by the usual link-connection 7 with the crank 8 on the main-shaft 9 disposed horizontally within the overhanging member of the gooseneck and at its rearward end carrying the clip-belt pulley 10 and balance wheel 11 with the main power-receiving V-groove pulley 12. The usual take-up 13 and tension devices 14 are also included in the gooseneck 1.

Secured to the seat 15 at the front side of the bend in the gooseneck is the one-piece hollow arm-casting comprising the upper forwardly projecting arms 16, the upper laterally extending arm 17, the vertically depending arm 18 carrying the horizontal work-supporting arm 19 terminating at its free end below the head 2 of the gooseneck.

Journaled in the bearing-bushings 20, 21, Fig. 4, is the counter-shaft 22 which is disposed within and lengthwise of the laterally extending arm 17 and is used to drive the loop-takers and feeding mechanism within the work-supporting arm 19. The shaft 22 is extended outside of the frame arms 16, 17, beyond the bearing-bushing 21, and has fixed to such external extension a clip-belt pulley 23 which is connected to the pulley 10 by the clip-belt 24 around which is secured the belt-guard 25 having a removable side-cover 26.

The loop-taker actuating mechanism comprises the two bevel-gears 27 between the bearings 20, 21, which gears mesh with the pinions 28 fixed to the vertical loop-taker driving shafts 29 journaled in the alined upper and lower bushings 30, 31 fixed by set screws 30′, 31′ in the bearing-supporting lugs 32 within the vertical member 18 of the frame. The vertical shafts 29 have fixed to their lower ends the bevel gears 33 which mesh with the gears 34 on the loop-taker actuating-shafts 35 extending lengthwise of and within the work-supporting arm 19.

The shafts 35 are journaled in bearings 36 in the respective loop-taker carrier frames 37 which are supported for pivotal adjusting movement about the axes of the respective drive-shafts 29 by being secured by set screws 37′ to the bushings 31 in which the shafts 29 are journaled. At their ends opposite the bushings 31, the frames 37 are formed with slots 38, Fig. 2, through which pass the fastening screws 39.

Journaled in bearings 40, Fig. 1, in the frames 37 are the loop-taker shafts 41 to the lower ends of which are fixed the bevel gears 42 meshing with the gears 43 on the respective actuating shafts 35. The shafts 41 carry the usual rotary hooks 44 which seize needle-loops from the respective needles 5 and pass such loops around the respective lower thread cases 44′ to form two spaced rows of lock-stitches. Obviously, the loop-takers may, by loosening the screws 39 and 31′ be pivotally adjusted about the axes of the respective driving shafts 29 and set to any desired spacing of the needles within the limits provided. The present loop-takers are geared to make two rotations to one reciprocation of the needles, in accordance with the common practice.

The feeding mechanism is preferably constructed as follows:—Mounted on the fulcrum pedestal 45 within the work-supporting arm 19 is the eccentric shank 45′ of the fulcrum pin 45″ embraced by the fulcrum block 46 on which rocks and slides the feed-lever 47 carrying the feed-dog 48. Fulcrumed on a cross-pin 49 in the vertical arm 18 is the feed-advance lever 50 the lower forked end of which embraces a block 51 on the pivot pin 52 passing through a hole in the end of the feed-lever and fixed by a set-screw 53, Fig. 3, in a hole in the lower end of the feed-lift link 54. The upper forked end of the feed-advance lever 50 embraces the bearing blocks 55 which embrace the adjustable feed-advance eccentric 56 mounted on the shaft 22 between the bearings 20, 21. The feed-lift link 54 embraces the feed-lift eccentric 57 also mounted on the shaft 22 between the bearings 20, 21. By turning the fulcrum pin 45″ with its eccentric shank 45′ the working level of the feed-dog 48 may be adjusted.

It will be noted in Fig. 1 that the bottom wall of the work-supporting arm is slightly pitched or inclined downwardly to the elbow 58 and that the spent oil 59 from the various working parts and bearings in the arms 17, 18 and 19 collects at the elbow 58 and may be withdrawn from time to time by raising the window plate 60 and inserting an oil gun or other suction device. The window plate 60 slides in the ways 61 provided in the vertical arm 18 and is found in practice to be oil tight. Any oil which may spatter onto the inner face of the window will gravitate to the lower edge of the latter and be drained by the short trough 67 into the oil reservoir in the elbow 58.

The gooseneck 1 is secured by four bolts 62 to the base-block 63 which is secured to the table top 64 by the bolts 65. The bolts 62 are arranged equi-angularly about an imaginary center 66 permitting the sewing machine to be set up on the block 63 with the arm 19 in a

desired one of a plurality of possible angular relations with the edge of the table top, to suit the requirements of the operator.

The invention is not to be understood as limited in all of its aspects to a sewing machine of the lock-stitch type. The terms "loop-taker", "loop-taking mechanism", and the like, as used in the claims, are to be interpreted broadly as covering any mechanism complementary to the needle or needles and taking loops of thread from such needle or needles in the formation of stitches.

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

1. A sewing machine having, a frame including a gooseneck, an upper forwardly projecting arm joined to the gooseneck, a laterally extending arm carried by the forwardly projecting arm, a depending arm carried by the laterally extending arm, a work-supporting arm carried by the depending arm, a main-shaft journaled in said gooseneck, a counter-shaft journaled in said laterally extending arm and connected to be driven by said main-shaft, spaced vertical shafts journaled in said vertically depending member and geared to said counter-shaft, spaced horizontal shafts journaled in the work-supporting arm and geared each to its respective one of said vertical shafts, spaced loop-takers connected to be driven each by its respective one of said horizontal shafts, and feeding mechanism including a feed-bar disposed within and lengthwise of the work-supporting arm between said horizontal loop-taker actuating shafts.

2. A feed-off-arm sewing machine having a gooseneck, a one-piece hollow arm casting secured to said gooseneck and including an upper forwardly extending arm, an upper laterally extending arm, a depending arm and a horizontal work-suporting arm, a main-shaft journaled in said gooseneck, a counter-shaft disposed within and having bearings at the opposite ends of said laterally extending arm, a reciprocating needle carried by said gooseneck, a loop-taker and feeding mechanisms carried by said work-supporting arm, and loop-taker and feed actuating devices carried by said counter-shaft between said bearings.

3. A sewing machine having, in combination, a gooseneck including a vertical standard and overhanging arm, said gooseneck being formed at its front side with a vertical seat at the top of said standard, a hollow forwardly extending arm joined to said seat, a hollow laterally extending arm carried by the forwardly extending arm, a hollow vertically depending arm carried by the laterally extending arm, a hollow work-supporting arm carried by the depending arm and terminating below the free end of said gooseneck, said forwardly extending, laterally extending, depending and work-supporting arms being cast in one piece, a main-shaft journaled in said gooseneck, a counter-shaft journaled in said laterally extending arm, a driving connection between said shafts externally of said forwardly extending arm, a reciprocating needle actuated by said main-shaft, and loop-taking and feeding mechanisms in said work-supporting arm connected to be actuated by said counter-shaft.

4. In a sewing machine, a vertically reciprocating needle, a loop-taker, a horizontally disposed loop-taker actuating shaft, a vertically disposed driving shaft for said actuating shaft, gear connections between said shafts, a frame in which said loop-taker actuating shaft is journaled, and means for pivotally supporting said frame for movement about the axis of said driving shaft.

5. A sewing machine having, in combination, a gooseneck including a vertical standard and overhanging arm, said gooseneck being formed at its front side with a vertical seat at the top of said standard, a hollow forwardly extending arm joined to said seat, a hollow laterally extending arm carried by the forwardly extending arm, a hollow vertically depending arm carried by the laterally extending arm, a hollow work-supporting arm carried by the depending arm and terminating below the free end of said gooseneck, said forwardly extending, laterally extending, depending and work-supporting arms being cast in one piece and constructed and arranged to permit the flow of spent oil from any point in the one piece casting to the elbow at the juncture of the depending and work-supporting arms, a main-shaft journaled in said gooseneck, a counter-shaft journaled in said laterally extending arm, a driving connection between said shafts, a reciprocating needle actuated by said main-shaft, and loop-taking and feeding mechanisms in said work-supporting arm connected to be actuated by said counter-shaft.

6. A feed-off-arm sewing machine having a frame comprising gooseneck and bed castings, the gooseneck casting being formed with a hollow vertical standard and a hollow overhanging bracket-arm terminating at its free end in a needle-bar head, said gooseneck casting being also formed on its front side with a seat at the top of said standard, said bed casting comprising four hollow angularly related arms cast in one piece and comprising an upper forwardly extending arm joined at one end to said seat, a laterally extending arm, carried by the free end of the forwardly extending arm, a depending arm carried by said laterally extending arm, a work-supporting arm carried by said depending arm and terminating below said needle-bar head, a main-shaft in the overhanging bracket-arm of said gooseneck, a reciprocating needle-bar carried by said needle-bar head and actuated from said main-shaft, loop-taking

and feeding mechanisms in said work-supporting arm, a counter-shaft in said laterally extending arm, operative connections between said counter-shaft and said loop-taking and feeding mechanisms, and a driving connection between said main-shaft and said counter-shaft.

7. A feed-off-arm sewing machine having, in combination, a gooseneck including a hollow vertical standard and a hollow overhanging arm, a rotary shaft journaled in said gooseneck and extending within and lengthwise of said overhanging arm, a reciprocating needle driven by said rotary shaft at the free end of said gooseneck, a work-supporting frame in the form of a hollow crooked arm detachably connected at one end to said gooseneck and terminating at its free end beneath the free end of said gooseneck, loop-taking and work-feeding devices in said work-supporting frame, a second rotary shaft in said work-supporting frame connected to drive said devices, and a driving belt between said shafts, said belt being disposed exteriorly of said gooseneck and work-supporting frame.

8. A two-needle lock-stitch sewing machine having a gooseneck and a hollow cylindrical work-supporting frame free at one end and at its other end joined to said gooseneck, a pair of reciprocating needles carried by said gooseneck, a pair of vertical axis rotary hooks disposed within the free end of said cylindrical work-supporting frame in cooperative relation with said needles, a rotary shaft mounted in said gooseneck and connected to drive said needles, a rotary shaft disposed within said hollow work-supporting frame, separate and independent driving connections from said last mentioned shaft to each of said hooks, means operatively connecting said shafts to one-another, and feeding mechanism in said work-supporting frame arranged to feed the work off of the free end of the latter.

9. In a sewing machine, a gooseneck and a work-supporting frame in the form of a crooked arm joined at one end only to said gooseneck, a reciprocating needle carried by said gooseneck, said work-supporting frame including integrally formed vertically depending and horizontally extending work-supporting arms, a loop-taker in said work-supporting arm, a loop-taker shaft disposed within and lengthwise of said work-supporting arm, a loop-taker carrier-frame in which said loop-taker shaft is journaled, said carrier-frame being removably secured to the work-supporting frame and being mounted wholly within the walls of the latter, and means for actuating said loop-taker shaft.

10. In a sewing machine, a gooseneck, a reciprocating needle carried by said gooseneck, a rotary shaft journaled in said gooseneck, a second rotary shaft parallel to said first mentioned shaft, a driving connection between said shafts, a hollow forwardly disposed arm in which said second mentioned shaft is journaled, a depending arm at one end of said forwardly disposed arm, a work-supporting arm carried by said depending arm, loop-taking and feeding mechanisms in said depending and work-supporting arms, said forwardly disposed arm, depending arm and work-supporting arm being cast in one piece, and means connected to said gooseneck and to the other end of said forwardly disposed arm for supporting said forwardly disposed, depending and work-supporting arms.

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

GEORGE M. EAMES.