Feb. 5, 1946. A. B. CLAYTON 2,394,510

SEWING MACHINE

Filed Nov. 17, 1944 3 Sheets-Sheet 1

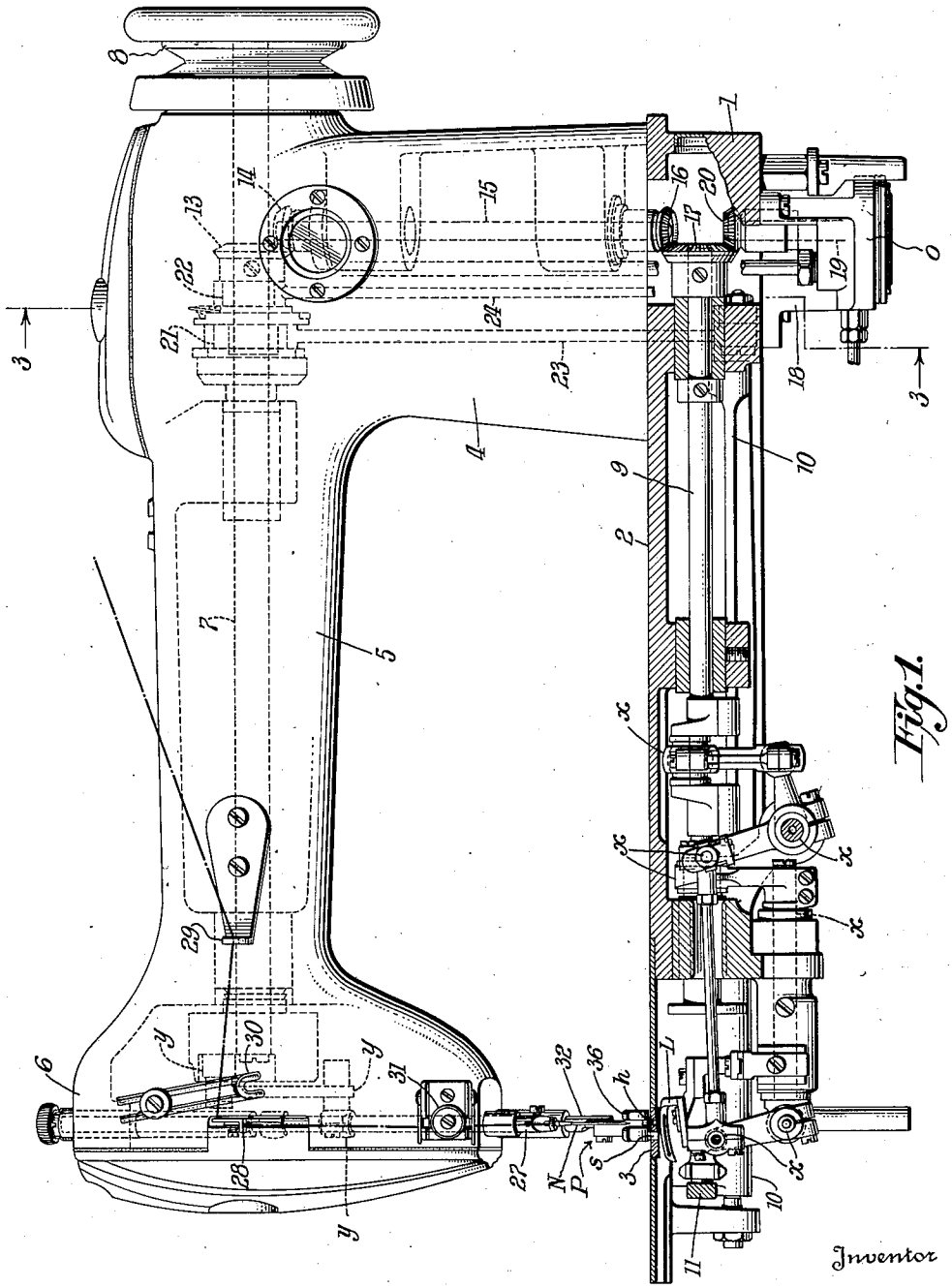


Fig. 1.

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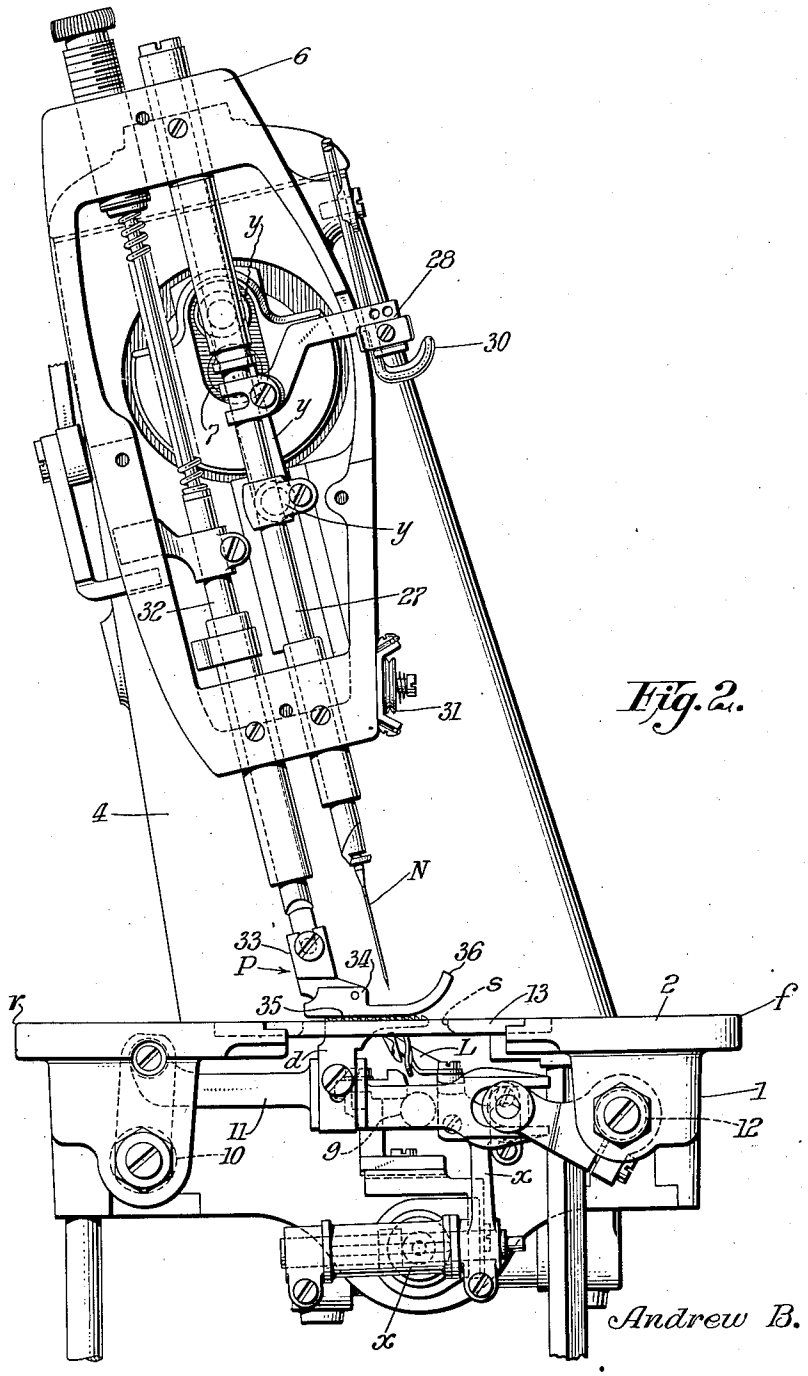


Fig. 2.

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SEWING MACHINE

Filed Nov. 17, 1944 3 Sheets-Sheet 3

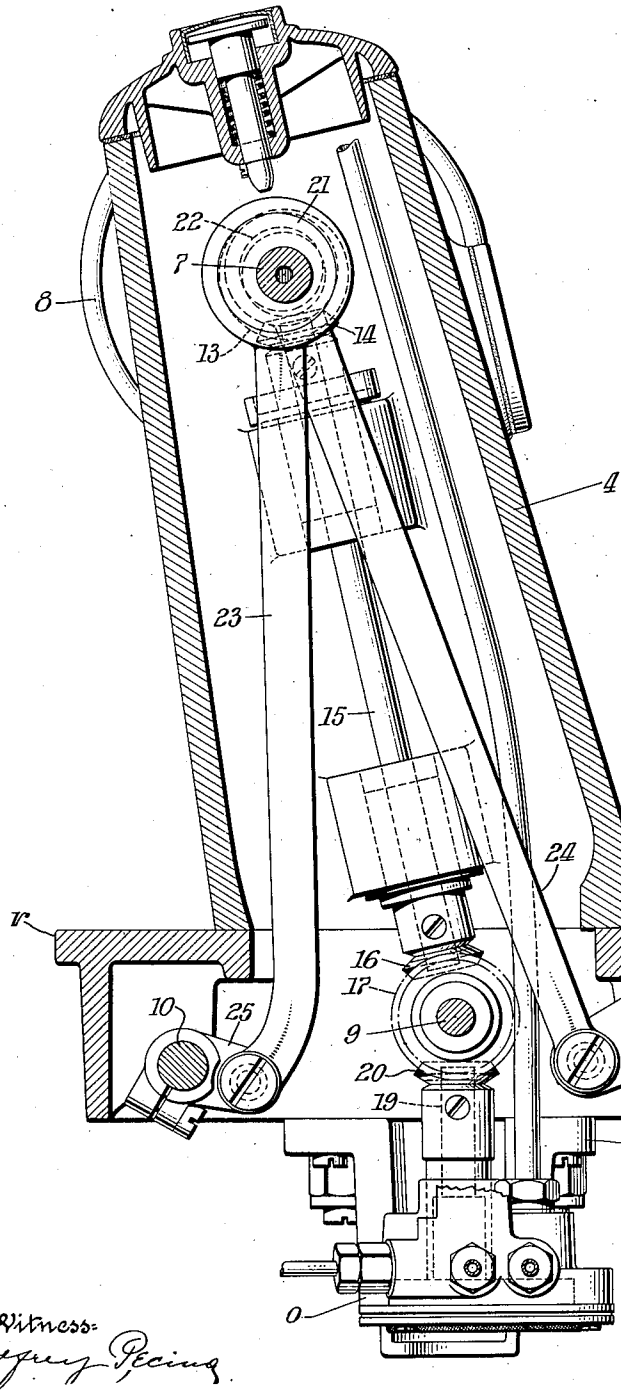


Fig. 3.

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UNITED STATES PATENT OFFICE

2,394,510

SEWING MACHINE

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Application November 17, 1944, Serial No. 563,821

11 Claims. (Cl. 112—258)

This invention relates to sewing machines and it has as a primary object to provide an improved sewing machine which will afford better visibility at the stitching point, as well as minimize interference with the operator in handling the work and the likelihood of having the operator's head contact parts of the sewing machine, even when she is closely scrutinizing the work at the stitching point.

In performing certain sewing operations such, for example, as close edge stitching on shoe uppers and gloves, especially in the crotch at the junction of two fingers of a glove (where the use of an edge guide for the work is not feasible) it is necessary that the machine operator closely observe and control the point at which the needle enters the work. To do this, in prior machines, it has been necessary for the operator to lean forward and place her head in such position that she may have an unobstructed close-up view of the work at the stitching point. This position has been difficult to attain because, if the operator does not lean forward far enough, her vision is obstructed by the work. If she leans slightly too far forwardly, her vision is obstructed by the bracket-arm and by parts carried thereby. Furthermore, this position of the operator is not only difficult to attain but it is also tiring to hold and it interferes with proper manipulation of the work. Still further, it places the operator's head in such position that, not infrequently, an operator is injured by contact with parts of the machine. This condition is particularly hazardous for operators who wear eye-glasses or who tend to be nearsighted.

Not the least annoying feature of prior machines has been the construction and arrangement of the machine standard and the overhanging bracket-arm. In prior machines the standard has usually risen vertically from the right end of the work-supporting plate of the sewing machine and the bracket-arm has projected to the left therefrom over the mid-portion of the work-supporting plate. This arrangement has, in many instances, interfered with the introduction and manipulation of the work, especially work which is necessarily led in from the right side, and has given the operator a feeling of being crowded in the region of her right arm and head, especially when leaning forward as above described.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings,

Fig. 1 is a front elevation, partly in section, of a sewing machine embodying the present invention.

Fig. 2 is an enlarged left end view of the machine shown in Fig. 1, with the face-plate removed.

Fig. 3 is an enlarged vertical sectional view taken substantially on the line 3—3 of Fig. 1.

Referring more specifically to the drawings, the invention is illustrated as embodied in a sewing machine comprising a base 1, affording a horizontally disposed work-supporting plate 2, having a front edge *f*, at the side at which the operator sits, and a rear edge *r* remote therefrom. Preferably a portion 3 of the work-supporting plate is removably secured to the main portion thereof and is provided with a needle-hole *h* and slots *s* for the passage of a conventional feed-dog *d*, later to be described. The portion 3 is commonly known as the "throat-plate" of the machine but for the purpose of this disclosure may be considered broadly as a part of the work-supporting plate.

Rising from the right end of the work-supporting plate 2 is a hollow standard 4 having formed integrally therewith an overhanging bracket-arm 5 carrying at its free end a bracket-arm head 6. Journaled lengthwise of the arm 5 is a main or needle-bar driving shaft 7 carrying, at its rear end, a combined belt-pulley and hand wheel 8 which may be driven from any suitable source of power.

Journaled in the base 1, beneath the work-supporting plate 2, is a rotary loop-taker driving shaft 9 which, through mechanism designated generally as *x*, imparts to a chain-stitch looper L its lengthwise and sidewise movements common to two-thread chain-stitch sewing machines.

Also carried by the base 1, beneath the work-plate, is a conventional four-motioned work-feeding mechanism including a feed-drive rock-shaft 10 connected to one end of a reciprocatory feed-bar 11 which carries the feed-dog *d*, and a feed-lift rock-shaft 12 which is connected to the feed-bar to give it its rising and falling movements.

Loop-taking and work-feeding mechanisms of the type indicated herein are disclosed more fully in my United States Patent No. 2,345,327, March

28, 1944, and inasmuch as the details thereof form no part of the present invention, further illustration and description thereof herein is deemed unnecessary.

The loop-taker shaft 9 is driven from the arm shaft 7 through the medium of a pair of bevel gears 13, 14, an intermediate shaft 15 journaled within and extending lengthwise of the standard 4, and a pair of bevel gears 16, 17. Secured to the underside of the base 1 is the casing 18 of an oil pump O which draws oil from a reservoir formed in a pan on which the machine is normally supported and forces the oil to the various bearings throughout the machine. This pump is actuated by a vertically arranged shaft 19 journaled in the pump casing and driven from the bevel gear 17 by a mating bevel gear 20. The pump O and the means for distributing oil therefrom to the various bearings of the machine also are disclosed in my above mentioned patent.

The feed-drive rock-shaft 10 and the feed-lift rock-shaft 12 are actuated from eccentrics 21 and 22, carried by the arm shaft 7, through the medium of pitmans 23 and 24 connected to rock-arms 25 and 26 carried, respectively, by the shafts 10 and 12.

In accordance with the present invention and as indicated most clearly in Figs. 2 and 3, the longitudinal axis of the standard 4 is upwardly inclined rearwardly away from the front of the work-supporting plate. This inclination of the standard is of great importance as it places the upper portion of the standard, and the entire bracket-arm 5 carried thereby, well to the rear of the machine; thus giving the operator greater clearance for the introduction and manipulation of the work and greater freedom for movement of her head and right arm, as well as relieving her from the discomfort of feeling crowded and unnecessarily restricted as to movement.

The bracket-arm head 6, carried by the bracket-arm 5, also is vertically inclined rearwardly similarly to the inclination of the standard 4, and carries an inclined reciprocating needle-bar 27 actuated from the shaft 7 by a conventional crank and link mechanism designated generally as *y*. The needle-bar carries, at its lower end, a downwardly and forwardly inclined eye-pointed needle N which cooperates with the loop-taker L in the formation of stitches. The needle-bar also carries a forwardly projecting take-up arm 28 which extends beyond the front face of the bracket-arm head and cooperates with a suitable thread-guide 29, thread-retaining element 30, and thread-checking device 31 in the controlling of the thread and the setting of the stitches. Except for their location and arrangement, the head 6 and the parts 28, 29, 30 and 31 are conventional but, as heretofore arranged, obstructed close view of the work and occasionally resulted in injury to the operator of the machine.

Also mounted in the head 6, substantially parallel to the inclined needle-bar, is a spring-depressed presser-bar 32 which carries, at its lower end, a presser-foot P comprising a shank 33 to which is attached a work-engaging foot 34 including a sole portion 35, adapted to bear flatwise on the work-supporting plate, and an upturned toe portion 36. This inclination of the presser-bar facilitates feeding of the work as it greatly reduces the lateral thrust imposed upon the presser-bar and avoids cramping action between the bar and its bearings. Thus the presser-bar is maintained more freely movable in its bearings; consequently permitting the use of substantially less spring pressure to force the presser-foot downwardly on the work during high speed operation of the machine.

Preferably, the standard, the bracket-arm head, the needle-bar and the presser-bar are inclined rearwardly between eight and sixteen degrees to a vertical plane extending lengthwise of the machine. As illustrated in the drawings the angle of inclination of these parts is, in the neighborhood of twelve degrees, but it is to be understood that a slight deviation from this angle, in either direction, is permissible and practical without departing from this invention and without sacrificing the advantages attained thereby.

It has been found that if the parts are inclined less than about eight degrees from the vertical, a clear vision of the stitching point is not obtained and the machine elements are located in such position that they are likely to be contacted by the operator's head or face when she leans forward. Likewise, such inclination of the parts does not afford the optimum clearance in the regions of the standard and the overhanging bracket-arm.

When the parts are inclined greater than sixteen degrees, the point of the needle does not always properly penetrate certain types of materials but tends to be deflected upwardly, thereby sometimes resulting in the skipping of stitches or in the breaking of the needle. Also, with the presser-bar arranged at an angle greater than sixteen degrees to the vertical, the presser-foot has, combined with its downward movement, an endwise movement which tends to push the work toward the front of the machine, and in a direction opposed to the direction of movement of the work by the feeding mechanism, which is objectionable.

Preferably the parts should be inclined rearwardly sufficiently to place the entire bracket-arm head rearwardly of a vertical plane extending lengthwise of the machine and intersecting the stitching point and to place all of the parts which project forwardly from that head, rearwardly of a vertical plane containing the upturned toe-portion of the presser-foot.

While this invention has been disclosed as embodied in a two-thread chain-stitch sewing machine, it is to be understood that the invention is not limited to that type of sewing machine but is equally adaptable to, and affords the same advantages, when embodied in other types of sewing machines, such, for example, as of the lock-stitch type.

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

1. A sewing machine having a frame including a horizontally disposed work-supporting plate and a standard supported by said plate and upwardly inclined rearwardly with respect to a vertical plane lengthwise of the machine, a horizontally disposed bracket-arm projecting laterally from said standard with its axis substantially parallel to the longitudinal axis of said work-supporting plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined in a direction similar to the direction of inclination of said standard, and stitch-forming mechanism carried by said frame and including a downwardly forwardly inclined needle below said head.

2. A sewing machine having a frame comprising a horizontally disposed work-supporting plate, a standard extending upwardly from said plate

and inclined rearwardly away from the front thereof, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined in a direction and to a degree similar to the direction and degree of inclination of said standard, and stitch-forming mechanism carried by said frame and including a downwardly forwardly inclined needle, and loop-taking mechanism located beneath said work-supporting plate and cooperating with said needle in the formation of stitches.

3. A sewing machine having a frame comprising a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and inclined rearwardly away from the front thereof, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined rearwardly similarly to the inclination of said standard, and stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head, a needle carried by the lower end of said needle-bar, and loop-taking mechanism located beneath said work-supporting plate and cooperating with said needle in the formation of stitches.

4. A sewing machine having a frame comprising a base affording a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and inclined rearwardly away from the front thereof, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined in a direction similar to the direction of inclination of said standard, stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head, a needle carried by the lower end of said needle-bar, chain-stitch loop-taking mechanism located beneath said work-supporting plate and cooperating with said needle in the formation of chain stitches, and work-feeding mechanism carried by said base beneath said work-supporting plate.

5. A sewing machine having a frame comprising a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and inclined rearwardly away from the front thereof with its axis approximately twelve degrees from a vertical plane lengthwise of the machine, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined rearwardly similarly to the inclination of said standard, a presser-bar mounted in said head and upwardly inclined rearwardly approximately twelve degrees from said vertical plane, a presser-foot carried by said presser-bar and having a sole portion bearing flatwise upon said work-supporting plate, and stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head substantially parallel to said presser-bar, a needle carried by the lower end of said needle-bar, and loop-taking mechanism located beneath said work-supporting plate and complemental to said needle in the formation of stitches.

6. A sewing machine having a frame comprising a base affording a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and inclined rearwardly away from the front thereof, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined rearwardly similarly to the inclination of said standard, a needle-bar driving shaft journaled lengthwise of said arm, a loop-taker driving shaft journaled lengthwise of said base, said needle-bar driving shaft being located in a vertical plane rearwardly of a vertical plane containing said loop-taker driving shaft, and stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head and actuated from said needle-bar driving shaft, a needle carried by the lower end of said needle-bar, and a loop-taker located beneath said work-supporting plate and operated from said loop-taker driving shaft and complemental to said needle in the formation of stitches.

7. A sewing machine having a frame comprising a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and inclined rearwardly away from the front thereof, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined rearwardly similarly to the inclination of said standard, an upwardly rearwardly inclined presser-bar mounted in said head, a presser-foot carried by said presser-bar and having a sole portion bearing flatwise on said work-supporting plate and an upturned toe portion, a shaft journaled lengthwise of said arm, stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head and actuated from said shaft, a needle carried by the lower end of said needle-bar, loop-taking mechanism located beneath said work-supporting plate and cooperating with said needle in the formation of stitches, and take-up mechanism extending forwardly from said bracket-arm head and actuated from said shaft, said take-up mechanism being located rearwardly of a vertical plane transverse to and containing the toe-portion of said presser-foot.

8. A sewing machine having a frame comprising a base affording a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and inclined rearwardly away from the front thereof, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined rearwardly similarly to the inclination of said standard, a shaft journaled lengthwise of said arm, a loop-taker shaft journaled in said base, means for rotating one of said shafts, an operative connection extending lengthwise of said inclined standard for driving one of said shafts from the other, stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head, a needle carried by the lower end of said needle-bar, loop-taking mechanism located beneath said work-supporting plate and cooperating with said needle in the formation of stitches, work-feeding mechanism carried by said base beneath said

work-supporting plate and including feed-drive and feed-lift shafts, and operative connections extending lengthwise of said inclined standard for driving the last named shafts from the bracket-arm shaft.

9. A sewing machine as set forth in claim 8 in which the base of the machine also supports a lubricant pump having an upright actuating shaft and in which means is provided for driving said pump shaft from the driving means between the bracket-arm shaft and the loop-taker actuating shaft.

10. A sewing machine having a frame comprising a base affording a horizontally disposed work-supporting plate, a standard extending upwardly from said plate and having its axis inclined rearwardly between eight and sixteen degrees from the vertical, a horizontally disposed bracket-arm projecting laterally from said standard and overhanging said plate, a bracket-arm head carried by the free end of said bracket-arm, said head being inclined rearwardly similarly to the inclination of said standard, and stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocatory needle-bar mounted in said head, a needle carried by the lower end of said needle-bar, and loop-taking mechanism located beneath said work-supporting plate and cooperating with said needle in the formation of stitches.

11. A sewing machine having a frame comprising a base, a standard extending upwardly from said base, a bracket-arm projecting laterally from said standard and overhanging said base, a bracket-arm head carried by the free end of said bracket-arm, a horizontally disposed needle-bar driving shaft journaled lengthwise of said arm, a loop-taker driving shaft journaled lengthwise of said base and parallel to said needle-bar driving shaft, said needle-bar driving shaft being located in a vertical plane rearwardly of a vertical plane containing said loop-taker shaft, stitch-forming mechanism carried by said frame and including an upwardly rearwardly inclined reciprocating needle-bar mounted in said head and actuated from said needle-bar driving shaft, a needle carried by the lower end of said needle-bar and extending downwardly forwardly therefrom, and a loop-taker operated from said loop-taker driving shaft and cooperating with said needle in the formation of stitches.

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