Dec. 24, 1929. N. V. CHRISTENSEN ET AL 1,741,095

FEED-OFF-THE-ARM SEWING MACHINE

Filed Feb. 16, 1925 6 Sheets-Sheet 1

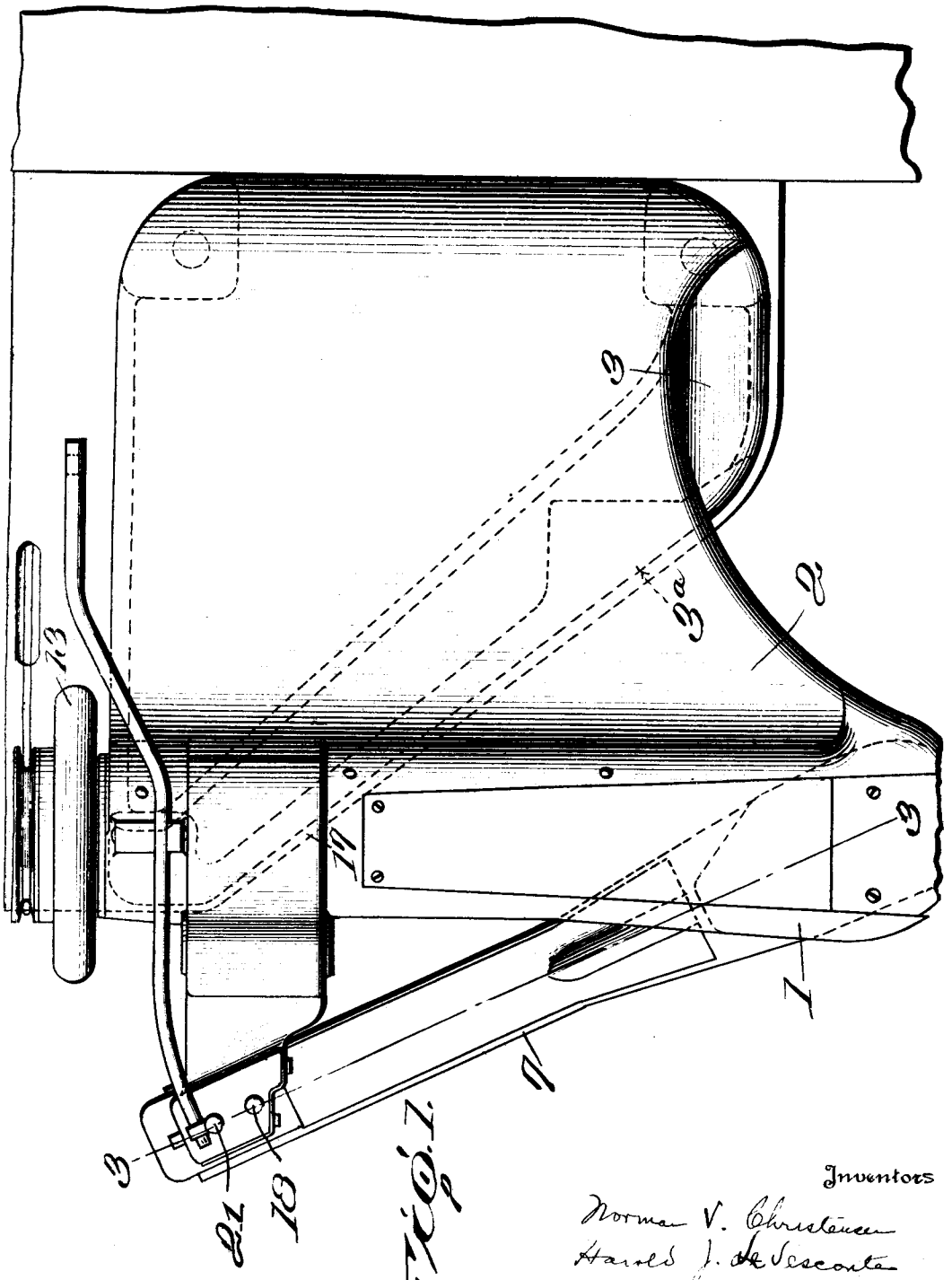


Fig. 1.

Inventors
Norman V. Christensen
Harold J. DeVeseonte

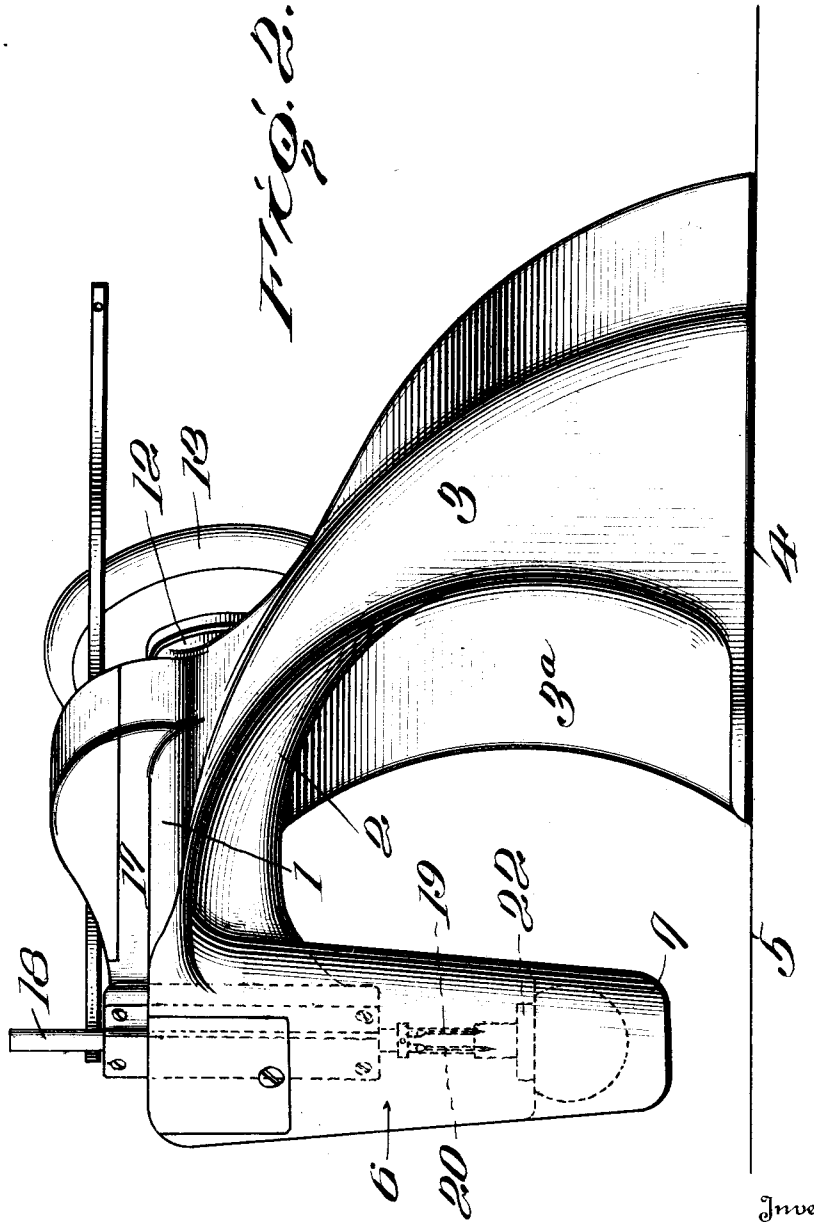
By Stuart Mason
Attorneys

Dec. 24, 1929. N. V. CHRISTENSEN ET AL 1,741,095

FEED-OFF-THE-ARM SEWING MACHINE

Filed Feb. 16, 1925 6 Sheets-Sheet 2

FIG. 2.



Inventors

Norman V. Christensen

Harold J. LeVesconte

By Sturtevant & Mason

Attorneys

Dec. 24, 1929. N. V. CHRISTENSEN ET AL 1,741,095

FEED-OFF-THE-ARM SEWING MACHINE

Filed Feb. 16, 1925 6 Sheets-Sheet 3

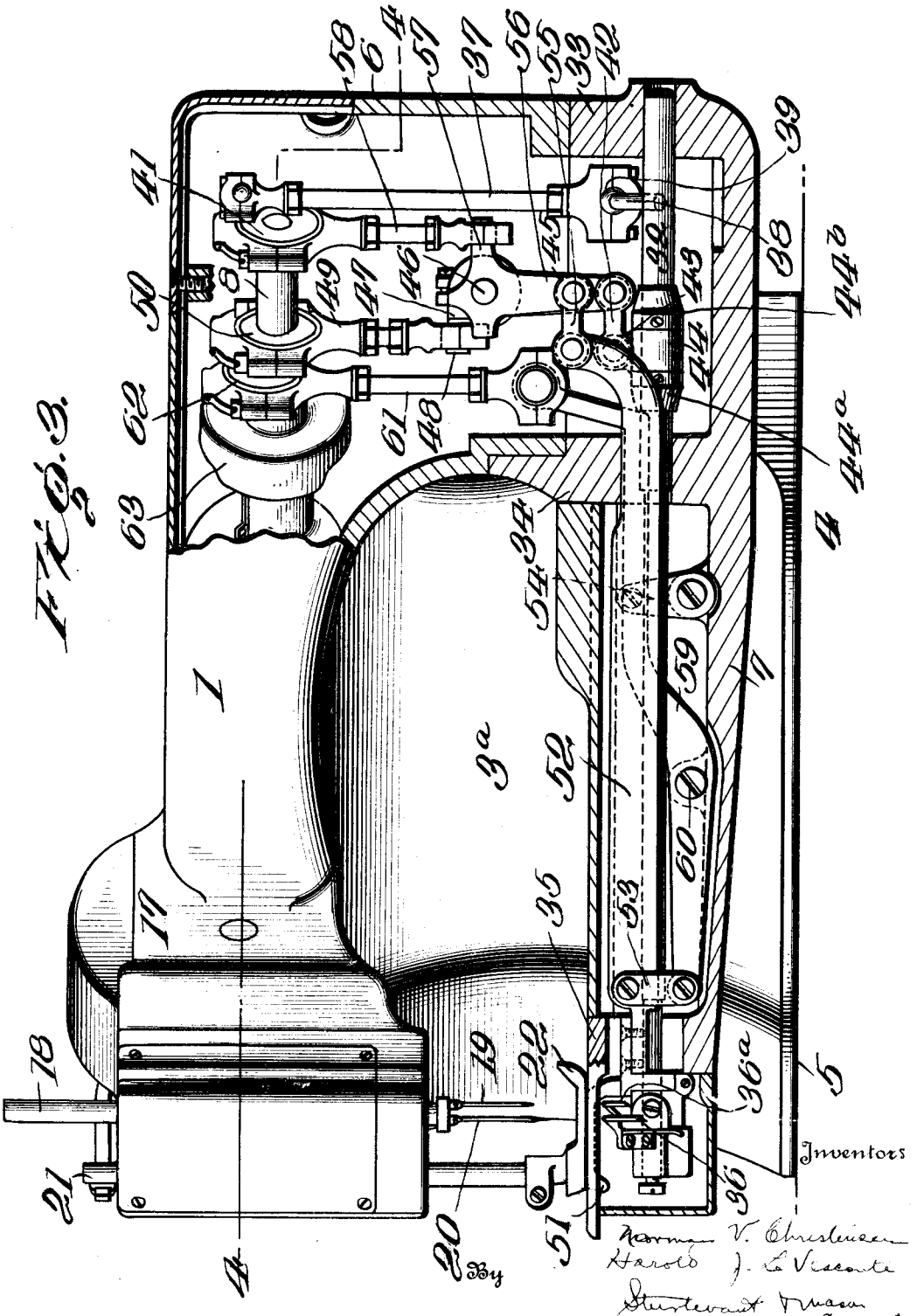


Fig. 3.

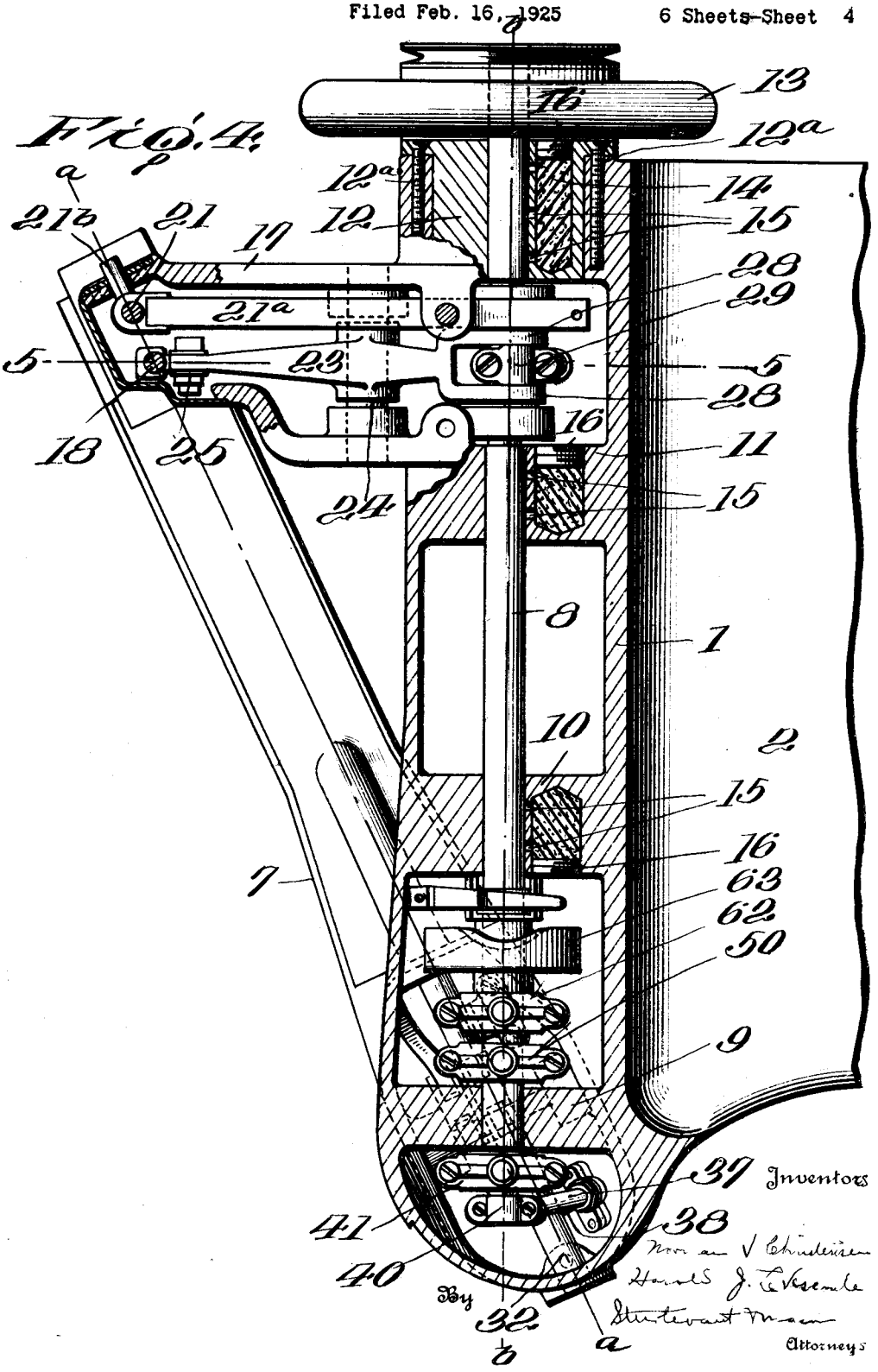
Inventors
Norman V. Christensen
Harold J. La Visconte
By Stuttevant & Mason
Attorneys

Dec. 24, 1929. N. V. CHRISTENSEN ET AL 1,741,095

FEED-OFF-THE-ARM SEWING MACHINE

Filed Feb. 16, 1925 6 Sheets-Sheet 4

Fig. 4.



Inventors

Niels V. Christensen

Harold J. Rosenberg

Stuart Vincent Mason

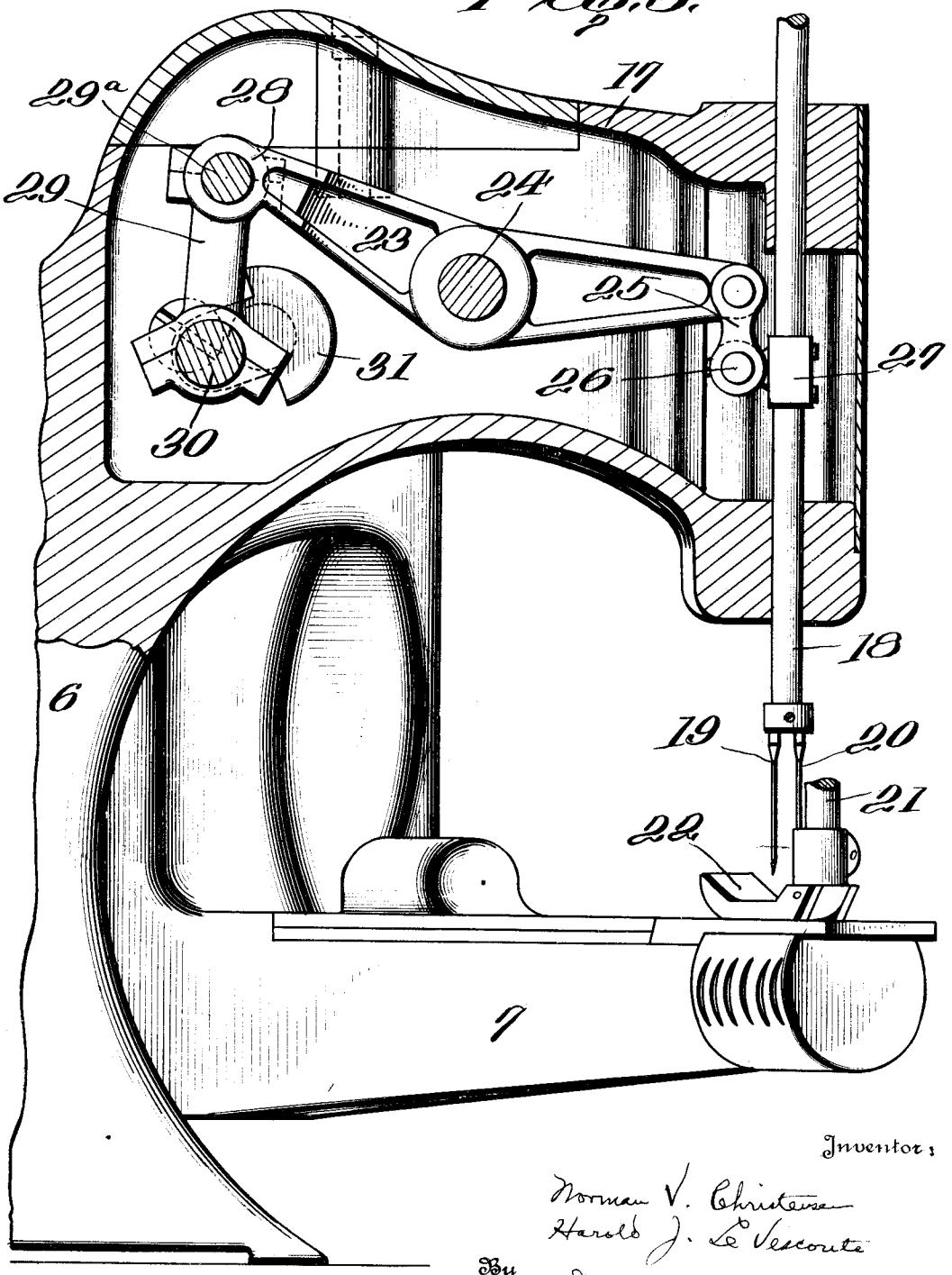
Attorneys

Dec. 24, 1929. N. V. CHRISTENSEN ET AL 1,741,095

FEED-OFF-THE-ARM SEWING MACHINE

Filed Feb. 16, 1925 6 Sheets-Sheet 5

Fig. 5.



Inventors:
Norman V. Christensen
Harold J. LeVesconte
By Sturtevant & Mason
Attorneys

Dec. 24, 1929. N. V. CHRISTENSEN ET AL 1,741,095

FEED-OFF-THE-ARM SEWING MACHINE

Filed Feb. 16, 1925 6 Sheets-Sheet 6

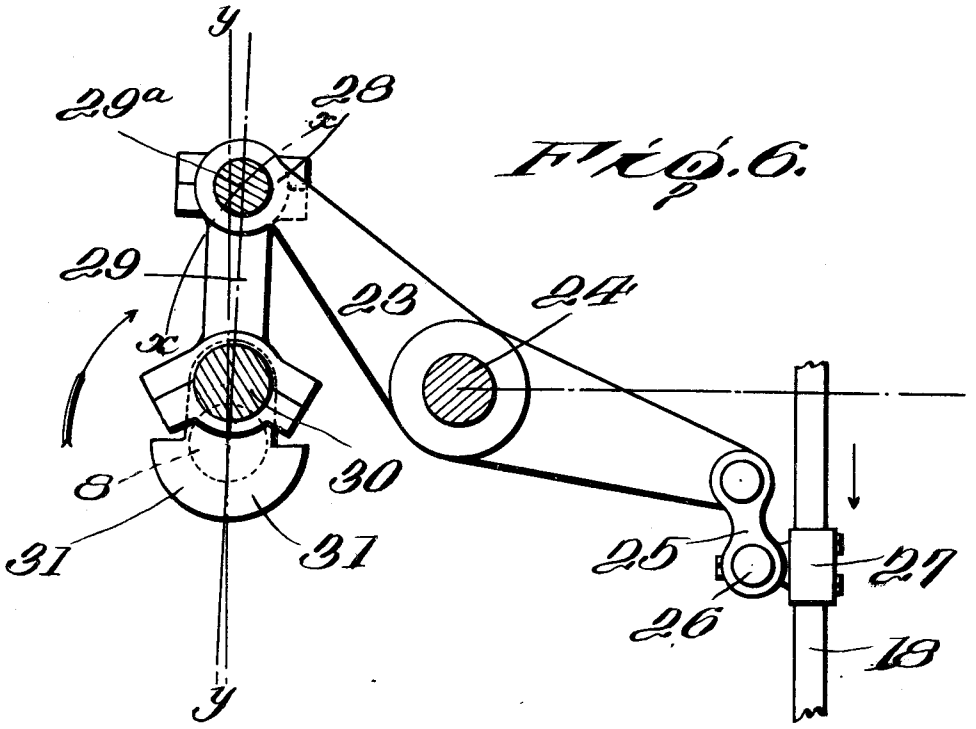
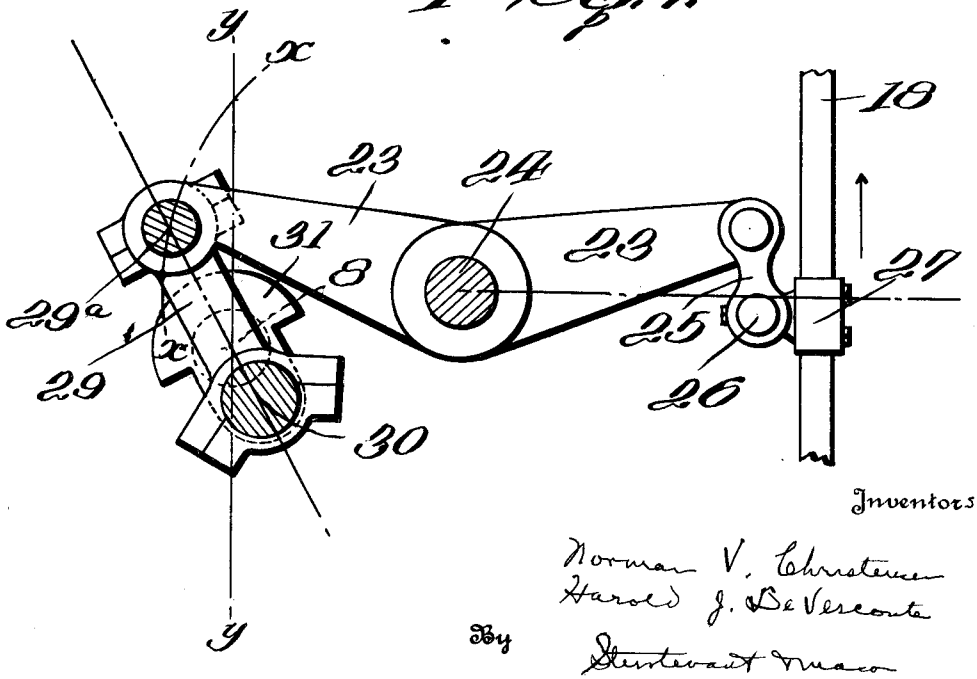


FIG. 6.

FIG. 7.



Inventors

Norman V. Christensen
Harold J. DeVerenta

By Stuntevant Mueller

Attorneys

Patented Dec. 24, 1929 1,741,095

UNITED STATES PATENT OFFICE

NORMAN V. CHRISTENSEN AND HAROLD J. LE VESCONTE, OF CHICAGO, ILLINOIS, ASSIGNORS TO UNION SPECIAL MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

FEED-OFF-THE-ARM SEWING MACHINE

Application filed February 16, 1925. Serial No. 9,584.

The invention relates to new and useful improvements in sewing machines, and more particularly to a sewing machine which is adapted to stitch tubular parts such as the sleeves or leg portions of a garment.

An object of the invention is to provide a machine of the above type which shall be comparatively free from angular parts in the frame structure containing the operating mechanism, so that the needle and the looper, and also the feeding mechanism can be driven from the main shaft by actuating mechanism wherein the connections transmitting the power to the part to be operated are few in number.

A further object of the invention is to provide a machine of the above type wherein the material being stitched is conveyed along a tubular work supporting arm and off from the free end thereof, and wherein the work supporting arm is so positioned relative to the remaining parts of the main frame, that the operator sitting at the supported end of said work supporting arm has a clear vision of the stitching point.

A still further object of the invention is to provide a machine of the above type wherein the work supporting arm and the actuating mechanism are mounted in and on a supporting frame which in turn is mounted on a bracket having a lateral portion attached to the upper portion of the supporting frame so that the entire frame containing the operating mechanism is suspended free of the work table.

A still further object of the invention is to provide a machine of the above type wherein said bracket is carried by a supporting base and is so constructed that the suspended portions of the frame are offset from said base so as to permit the arm of the operator to pass beneath the bracket on which said frame is mounted for guiding the material along the work supporting arm.

A further object of the invention is to provide a machine of the above type wherein the work supporting arm is set in a plane cutting a vertical plane containing the upper main supporting part of the frame and containing the driving shaft at an acute angle, so that the free end of the work supporting arm is clearly visible to an operator sitting at the supported end of said work supporting arm.

A still further object of the invention is to provide a machine of the above type with a housing projecting laterally from the upper supported part of the frame over the free end of the work supporting arm, in which housing is mounted a needle bar and an actuating mechanism therefor.

A still further object of the invention is to provide a machine of the above type wherein the acutating pulley for the main shaft is located at the end of the actuating shaft adjacent the needle operating mechanism, so that the operator can readily reach said pulley for raising the needle when found necessary by reaching over the bracket with the right hand or around the needle housing with the left hand.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show by way of illustration one embodiment of the invention—

Figure 1 is a plan view of a sewing machine embodying the invention;

Fig. 2 is a front view of the same;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is a sectional view on the line 5—5 of Fig. 4;

Fig. 6 is a detail showing the manner of connecting the operating lever to the needle bar and the rotating shaft for reciprocating the needle bar, said needle bar being at the lower end of its stroke, and

Fig. 7 is a similar view, but showing the needle bar at the upper end of its stroke.

The invention is directed broadly to a sewing machine which is adapted for stitching tubular articles, such as the sleeves and leg portions of garments. To this end, the machine is provided with a work supporting arm around which the material may be formed into a tubular portion, and this tubular portion as it is formed is fed along the arm by

a feeding mechanism and is stitched as the material leaves the end of the work supporting arm. This work supporting arm is, of course, suspended so that the material can pass underneath the same and be formed around the arm into tubular shape. The main frame containing the actuating mechanism of the sewing machine includes an upper frame member in which the main operating shaft is located. The shaft extends lengthwise of this frame member and is provided with a driving pulley operated from suitable mechanism beneath the work table. The main frame structure also includes a vertical depending member carried by this upper frame member, and a work supporting arm which is mounted at the lower end of the vertical depending member and projects laterally therefrom. This is the work supporting arm around which the tube is formed and on which it is stitched. The actuating parts in the work supporting arm for the looper and the feeding mechanism are all connected to the main shaft through this vertical depending member. The end of the looper shaft is directly beneath the end of the main actuating shaft, and therefore, the looper shaft may be oscillated by a direct connection from the actuating shaft. There is only one angular bend in the frame between the part containing the actuating shaft and the part where the looper and feed mechanism are located, and therefore, the actuating mechanisms for these parts contain few connections. As a result, the looper will maintain its timing as originally set.

The main frame structure of the machine also includes a housing carried by the upper frame member and projecting laterally therefrom. The needle bar is mounted in this housing and also an actuating mechanism for the needle bar. This actuating mechanism includes a direct connection to the main actuating shaft in the upper frame member, and therefore, the needle bar is operated by very direct connections, and the needle will maintain its original timing notwithstanding the fact that the machine is operated at high speed. In other words, the needle should pass the looper at a predetermined time in order to avoid skipping stitches. Likewise the looper should pass the needle at a given time so as to get into the needle loop. After the actuating parts have been adjusted so as to bring about proper timing for stitching, there is little or no chance of these parts getting out of timing, as often happens in machines of this general character where the actuating parts and connections therefor, are many, in order to transmit the motions derived from the main actuating shaft around angular corners in the frame structure. The work supporting arm lies in a plane cutting this upper main frame and the actuating shaft at an acute angle, so that the operator sitting directly in front of the depending portion of the main frame structure, will get a clear vision of the stitching point. The housing for the needle bar and the actuating parts therefor, extends laterally from this upper main frame member to a point over the free end of the work supporting arm.

The entire sewing machine structure as a unit is suspended by means of a bracket which is connected to said upper main frame member. The bracket preferably extends the entire length of this upper main frame member and is in turn supported by a base which may be attached to the work table. The length of the vertical portion of the bracket is sufficient so that the entire work supporting arm is suspended above the work table. Said bracket also has a lateral or horizontal portion, and this is of sufficient length so that the main supporting frame is offset from the base and that portion of the bracket rising directly therefrom, and therefore, the arm of the operator may pass underneath the bracket and guide the material along the work supporting arm. The face of the bracket which is parallel with the work support is curved for clearance. The upper horizontal member is not only spaced from the front face of the base by reason of the overhang in the bracket, but it is also set at an acute angle to the front face of the base. By this angular arrangement of the main portion of the frame of the sewing machine unit ample clearance space can be obtained for the arm of the operator and at the same time the sewing machine unit will be supported on the bracket more nearly over the base. This angular arrangement of the upper horizontal member need, of course, only be sufficient to allow the desired free space for the arm of the operator between the bracket and the frame.

Attention is particularly directed to the simplicity of the main frame structure, which includes the upper frame member in which the main shaft is located; the laterally projecting housing at one end thereof, through which the needle bar is supported and operated, and the vertical depending member at the other end thereof which carries the work supporting arm and through which the looper and the feeding mechanism are operated, and all of these parts of the frame are suspended at the outer end of the horizontal portion of the bracket.

Referring more in detail to the drawings, the machine includes an upper frame member 1 which is in the form of a sleeve. This upper frame member 1 is in turn mounted on the outer end of a laterally extending bracket 2 which is preferably formed integral therewith. The bracket 2 extends substantially throughout the entire length of the sleeve as cleary shown in Fig. 1 of the drawings. The bracket 2 is mounted on a supporting base 4. Said base has an upwardly

extending bracket portion 3 which is joined to and formed integral with the laterally extending portion 2 of the bracket. The vertical portion curves outward as at 3^a, and then merges into the lateral portion. The laterally extending bracket 2 of the supporting base 4 forms an overhang or a portion which overhangs the adjacent lower portion of said base. The upper frame member 1 mounted at the outer end of the laterally extending bracket 2 extends transversely of the forward extremity of said overhanging portion. By reason of this construction, this upper frame member 1 is carried by a base, which base is located substantially wholly at one side of a vertical plane containing the longitudinal center of said upper supporting member. The base portion is adapted to be bolted to the table. At the front end of the upper supporting frame member there is a vertically depending portion 6 (see Figures 2 and 3). Attached to the lower end of this depending portion is the work supporting arm 7. Said work supporting arm 7 may be cast separate from the depending portion and the supporting member which carries the same. The depending member is preferably divided intermediate its ends, and the upper portion thereof is cast with the upper main supporting frame, while the lower portion thereof is cast with the work supporting arm. This simplifies the casting of the frame. The work supporting arm 7 projects in a horizontal plane from the lower end of the depending member 6, and the longitudinal axis of this work supporting member lies in a vertical plane which cuts a vertical plane containing the longitudinal axis of the upper frame member at an acute angle. Attention is called to Fig. 4, wherein the vertical plane containing the longitudinal axis of the work supporting arm is indicated at *a—a*, and the vertical plane containing the longitudinal axis of the upper frame supporting member is indicated at *b—b*.

It will be readily seen from Fig. 3 of the drawings that this inclination of the work supporting arm to the upper frame member is such that the operator sitting in front of the depending portion 6 may readily view the material passing along the work supporting arm, and particularly at the stitching region, which is the outer end of this work supporting arm. Located in this upper main frame member 1 is the main rotating shaft 8. Said shaft is mounted in suitable bearings in the cross members 9, 10 and 11 formed as an integral part of said upper frame member. In place of the integral cross member at the rear end of this upper frame, there is a detachable bearing 12 secured in the end of the sleeve forming said upper frame member by suitable screws 12^a. The main shaft terminates in front of the bearing 9 and extends through bearing 12 so that on the rear end of the shaft there may be mounted a belt pulley 13 for driving said shaft. The cross members 10 and 11 and the detachable bearing 12 are each provided with a recess in which will be placed suitable oil retaining material 14. These recesses are provided in turn with suitable ports 15 leading to the main shaft, and each recess is closed by a screw cap 16.

The shaft 8 is the main rotating shaft of the machine, and from it all the parts of the machine are actuated. There is a laterally projecting housing carried by this upper frame member, in which reciprocates the needle bar 18 carrying the needles of the stitching mechanism. This housing projects over the free end of the work supporting arm. The needle bar is provided with two needles 19 and 20. Also mounted in this housing is a presser bar 21 carrying a presser foot 22 which may be of any desired type. The presser bar is yieldingly held against the work support by means of a leaf spring 21^a (see Fig. 4). This leaf spring is mounted in the housing 17, and the presser bar 21 is kept from oscillating in its bearings by means of a pin 21^b projecting laterally from the presser bar and located in a suitable slot in the housing 17.

The needle bar 18 is reciprocated by means of a lever 23 which is fulcrumed on a stud 24 mounted in the housing 17. Said lever is connected to the needle bar by means of a link 25 which is pivoted at 26 to a projecting lug carried by the sleeve 27 surrounding the needle lever and connected thereto by suitable set screws. The rear end of the needle lever 23 is forked as indicated at 28 (see Fig. 4). The link 29 is pivoted to a stud carried by the forked end 28 of the needle lever 23. This link 29 is connected at its lower end to a crank 30 formed in the shaft 8. The crank 30 is located adjacent the cross member 11 (see Fig. 4). This shaft 8 is provided with a suitable counter weight 31 for the crank, so as to insure even running of the shaft. In Figures 6 and 7, we have shown in detail the needle reciprocating mechanism just described. The crank 30 rotates in a clockwise direction as viewed in these figures. The left-hand end of the needle lever moves in the arc of a circle which is indicated by the broken line *x—x*, and this lever is so shaped that the outer end moves from a position substantially coincident with the line *y—y* (see Fig. 6) to a position at one side thereof (see Fig 7). When the parts are in the position shown in Fig. 6, the needle lever is all the way down, and the needles are at their extreme lower position. When the parts are in the position shown in Fig. 7, the needle lever is all the way up. Inasmuch as the shaft 8 rotates in a clockwise direction the crank moves through an arc of considerably less than one hundred and eighty degrees when the parts are moved from the position shown in Fig. 6 to the position

shown in Fig. 7, and through an arc of considerably more than one hundred and eighty degrees when the parts are returned to the position shown in Fig. 6. This is caused by the fact that the center 29^a of the pin connecting the link 29 to the lever 23 moves in an arc or portion of a circle, while the crank moves in a complete circle. The needle bar is at its extreme lower position when the center 29^a, the center of the crank 30, and the center of the shaft 8 are in alinement, while the needle bar is at the upper end of its stroke when these points come again into alinement, and the fact that the center 29^a moves away from the vertical line y—y, will cause the time when these points reach alinement to be first less, then greater than a half rotation of the shaft 18 (see Fig. 7). Thus the parts move considerably faster from position in Fig. 6 to position in Fig. 7; thus giving the quick ascent of the needles, which is desirable to get the needles out of the goods before the feed takes place.

Located in the work supporting arm 7 is a looper shaft 32. This shaft is mounted in a bearing 33 at the front end of the work supporting arm 7, and also in a bearing formed in the cross member 35 which is near the free end of the work supporting arm 7. Said shaft also has a bearing support in the cross member 34 which is a part of the work support 7. Mounted on the rear end of the shaft 32 are two loopers 36 and 36^a. The needles are set in a diagonal line and the looper 36 cooperates with the needle 20, while the looper 36^a cooperates with the needle 19. This is an ordinary two line stitching mechanism, and has been shown in detail merely to illustrate one form of stitching mechanism that may be used in the machine, and its location. These loopers are thread carrying loopers, and are not only moved into and out of the needle loops, but are also moved laterally for a needle avoiding movement. The looper shaft 32 is oscillated by means of a link 37. This link 37 is connected at its lower end to a ball 39 on the end of a radial arm 38 rigid with the looper shaft 32. The upper end of link 37 is connected to a ball stud 40 carried by the eccentric 41 on the end of the main shaft 8. This ball stud 40, is, in effect, a crank, as it is eccentrically mounted relative to the axis of the shaft 8, so that as the shaft 8 rotates, the link 37 is moved bodily up and down, and this in turn will oscillate the shaft 32. The shaft 32 is moved endwise in order to give a needle avoiding movement to the loopers, by means of a link 42 which is pivoted to a lug 43 formed integral with a sleeve 44 carried by the shaft 32, and held from endwise movements thereon by the collars 44^a and 44^b located at the opposite ends of the sleeve 44 and secured by set screws to the looper shaft 32. It will be apparent that any endwise movement given to the link 42 will move the shaft endwise, but this sleeve 44 is free on the looper shaft, and therefore, the looper shaft can be oscillated for moving the loopers into and out of the needle loops, said shaft turning freely in the sleeve 44.

The link 42 is moved endwise by means of a bell crank. Said link is connected to a downwardly extending arm 45 of said bell crank. The bell crank is fulcrumed at 46 on a cross shaft mounted in the depending portion of the frame. This bell crank is in turn provided with a short arm 47 carrying a ball stud 48 to which an eccentric strap 49 is attached. Said eccentric strap cooperates with an eccentric 50 on the main shaft 8. The looper is given its lateral movements by a connection actuated by the main shaft 8, and this connection consists of three parts: an eccentric strap, a bell crank, and a connecting link. The looper is given its oscillations by a single moving element, that is, a link connected directly with the crank on the main shaft, and an arm rigidly carried by the looper shaft. This insures the lateral movements of the looper, and also the oscillating movements of the looper by very few connections. This is particularly true of the means for oscillating the looper. Therefore, when the looper is once set and connected to the actuating shaft, there is very little chance of any of the parts working loose or the looper losing its original timing. The needle bar is reciprocated by a lever connected at one end through a link to the needle bar, and connected at its other end through a link to a rotating crank in the main shaft. This short positive connection for moving the needle bar up and down likewise insures that the needle shall maintain the original timing, and not lose its timing through the working loose of any actuating parts. By reason of the above construction, the needle and the looper after once set for proper stitching are not liable to get out of timing so as to skip stitches.

The material is fed off the end of the work supporting arm by means of a feed dog 51. Said feed dog 51 is carried by a feed bar 52 which is mounted on suitable links 53 and 54, and said feed bar is connected at the front end of the machine by means of a link 55 to a bell crank 56, which bell crank is provided with an arm 57, which in turn is pivoted to an eccentric strap 58 which cooperates with the eccentric 41 on the end of the main shaft. Thus it is that the feed dog is moved back and forth.

The feed bar is raised and lowered by means of a lever 59, which lever is fulcrumed at 60 and is connected at its front end to an eccentric strap 61, which cooperates with an eccentric 62 on the main shaft. The feeding mechanism thus very generally referred to is of the single feed dog type, having four motions, that is, a back and forth and an up and down. Said feed dog operates to feed

the material off from the end of the work supporting arm.

The stitching mechanism illustrated as above noted is suitable for stitching woven material, wherein the seam is formed by overlapping the sections of the material and uniting said overlapped sections by stitching. The material however, if knit fabric, should be stitched by a different character of stitching mechanism. The edges might be secured together by any character of stitching mechanism wherein the needle threads are connected above and below the material so as to form a covered seam of any well known character for forming seams in knit material. If knit material is operated upon, then of course, a differential feeding mechanism would be used. The various types of stitching mechanisms and types of feeding mechanisms that might be used have not been illustrated, as this invention is directed particularly to a construction of frame essential for supporting the actuating parts and permitting tubular work to be done, and wherein comparatively few connections are necessary for said actuating parts, so that the machine may be positively driven at high speed without the needle and looper getting out of timing and skipping stitches.

We have not attempted to show the thread controlling mechanism for the needle threads, nor the thread controlling mechanism for the looper threads in any great detail. We have, however, shown that the thread controller for the looper threads may be mounted on the shaft 8. This thread controller is indicated in Figures 3 and 4 at 63. Said thread controller is in the form of a disk mounted on the shaft having laterally projecting annular cams which are concentric to the shaft 8. Suitable guides, of course, are provided for holding the looper threads in engagement with these cams, and the cams are so shaped as to take up and give up the looper thread at proper times.

The machine may be placed on the work table in any suitable way, either with the main shaft 8 extending in a direction at right angles to the front of the table, or with said main shaft 8 parallel with the front edge of the table. The main actuating shaft is below the table, and would possibly work a little better with the shaft of the machine arranged parallel with the main shaft, which is the position that this shaft takes when the main shaft is parallel with the front edge of the table. When the machine is set in this position, the table is preferably cut away at the right of the depending portion so that the operator may sit in the space cut out from the table, and directly in front of the work supporting arm. The material, of course, will pass off from the end of the arm and into the aisle at the same side of the table at which the operator sits. This is not an objection, but rather a benefit, as the completed articles may be fed from the machine into proper receiving baskets or the like. When the main shaft is at right angles to the actuating shaft below the table, then the belt has to be given a quarter turn, and furthermore, the material as it passes off the free end of the work supporting arm, will be delivered on to the table.

As above noted, the work supporting arm is suspended a sufficient distance above the top of the table so that the material to be stitched may be passed underneath the arm and formed into a tube on the arm. The entire machine is light because it has few parts, and but few angular bends in the frame structure. The frame containing the actuating parts is suspended from the bracket which is attached to the upper frame member of the main frame. As a matter of fact, the frame containing the actuating parts is an entire sewing machine unit, and this unit is suspended from the bracket in the manner stated. When the belt pulley is placed at the end of the shaft adjacent the needle bar, the operator may sit adjacent the suspended end of the work supporting arm and in line therewith, and the belt pulley will not in any way interfere with this position of the operator. At the same time, the operator may readily reach the belt pulley for turning the actuating shaft to position the needle whenever desired. As has been noted, the invention is not limited to the specific form of stitching mechanism or feeding mechanism shown, but is directed broadly to the shaping of the frame of the machine and the manner of supporting said frame and the locating of the operating parts therein, which operating parts may be comparatively few in number, thus insuring an easy running machine, and one which may be run at high speed without skipping stitches.

The machine above described is equally adapted for all felling in shirt and overall work, as in all flat seam work for knit garments. Other uses may be made of the machine, but the machine is especially adapted for the above operations.

It is obvious that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is—

1. A sewing machine comprising a horizontal support adapted to carry the main shaft of the machine, a depending member at one end thereof, a work supporting arm carried by and projecting laterally from the lower end of said depending member, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said main shaft and said

depending member, whereby the free end of said work supporting arm is visible to the operator, means carried by said horizontal support for supporting the needle bar over the free end of said work supporting arm, a base on which said horizontal support is mounted, said base being located substantially at one side of a vertical plane containing said main shaft.

2. A sewing machine comprising a horizontal support adapted to carry the main shaft of the machine, a depending member at one end thereof, a work supporting arm carried by and projecting laterally from the lower end of said depending member, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said main shaft and said depending member, whereby the free end of said work supporting arm is visible to the operator, means carried by said horizontal support for supporting the needle bar over the free end of said work supporting arm, a base on which said horizontal support is mounted, said base being located substantially at one side of a vertical plane containing said main shaft, said main shaft having a driving pulley on the end thereof adjacent the needle bar.

3. A sewing machine comprising a horizontal member adapted to carry the main shaft of the machine, a depending member at one end of said horizontal member, a work supporting arm carried by and projecting laterally from the lower end of said depending member, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said horizontal member and said depending member, whereby the free end of said work supporting arm is visible to the operator, a supporting means projecting laterally from said horizontal member at the opposite end thereof from said depending member for supporting the needle bar over the free end of said work supporting arm, and means connected to said horizontal member at the side thereof and adjacent each end thereof for supporting said horizontal member and the parts carried thereby.

4. A sewing machine comprising a horizontal member, a main shaft located in said horizontal member, a depending member at one end of said horizontal member, a work supporting arm carried by and projecting laterally from the lower end of said depending member, supporting means projecting laterally from said horizontal member at the opposite end thereof from said depending member, a needle bar at the outer end of said supporting means, a needle bar actuating mechanism mounted on said supporting means for the needle bar and connected to said main shaft, a looper and a feed dog mounted at the free end of said work supporting arm, devices for actuating said looper and said feed dog extending along said work supporting arm, and devices actuated by said main shaft and extending through said depending member for operating the devices in said work supporting arm which are connected to said looper and said feed dog, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said horizontal member and said depending member, whereby the free end of said work supporting arm is visible to the operator, and means connected to said horizontal member at the side thereof and adjacent each end thereof for supporting said horizontal member and the parts carried thereby.

5. A sewing machine comprising an upper horizontal member adapted to carry the main shaft of the machine, a depending member at one end of said upper member, a work supporting arm carried by and projecting laterally from the lower end of said depending member, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said horizontal member and said depending member, whereby the free end of the work supporting arm is visible to the operator, and means connected to said upper horizontal member at the side thereof and adjacent each end thereof for supporting said horizontal member and the parts carried thereby, whereby said work supporting arm is suspended and clearance provided beneath the same for the material being stitched.

6. A sewing machine comprising an upper horizontal member adapted to carry the main shaft of the machine, a depending member at one end of said upper member, a work supporting arm carried by and projecting laterally from the lower end of said depending member, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said horizontal member and said depending member, whereby the free end of the work supporting arm is visible to the operator, means connected to said upper horizontal member at the side thereof and adjacent each end thereof for supporting said horizontal member and the parts carried thereby, whereby said work supporting arm is suspended and clearance provided beneath the same for the material being stitched, and means carried by said upper horizontal member for supporting a reciprocating needle bar directly above the free end of said work supporting arm.

7. A sewing machine comprising an upper horizontal member adapted to carry the main shaft of the machine, a depending member at one end of said upper member, a work supporting arm carried by and projecting laterally from the lower end of said depending member, said work supporting arm being located in a vertical plane disposed at an acute angle to a plane common to said horizontal member and said depending member, where-

by the free end of the work supporting arm is visible to the operator, means carried by said horizontal member for supporting a reciprocating needle bar directly over the free end of said work supporting arm, and a supporting base having an overhanging portion connected to said upper horizontal member at the side thereof and adjacent each end thereof for suspending said horizontal member and the parts carried thereby.

8. A frame for sewing machines comprising an upper horizontal member, a vertical depending member at one end thereof, a laterally projecting housing at the other end of said upper horizontal member, a work supporting arm carried by and projecting laterally from the lower end of said vertical member and having its free end extending beneath the outer end of said housing, a supporting base having an upwardly and laterally extending bracket, said bracket being connected to said upper horizontal member at the side thereof and through said connection suspending the entire frame of the sewing machine, said bracket being integral with said upper horizontal member and connected thereto throughout substantially the entire length of said horizontal member.

9. A frame for sewing machines comprising an upper horizontal member, a vertical depending member at one end thereof, a laterally projecting housing at the other end of said upper horizontal member, a work supporting arm carried by and projecting laterally from the lower end of said vertical member and having its free end extending beneath the outer end of said housing, a supporting base having an upwardly and laterally extending bracket, said bracket being connected to said upper horizontal member at the side thereof and through said connection suspending the entire frame of the sewing machine, the base of the standard adjacent the work supporting arm being substantially parallel thereto and spaced therefrom so as to enable the operator to guide the material along the work supporting arm.

10. A sewing machine comprising an upper horizontal member, a vertical depending member at one end thereof, a housing carried by the other end of said upper horizontal member and projecting laterally therefrom a work supporting arm carried by the lower end of said vertical member and projecting laterally therefrom, and at an angle so that its free end is underneath the outer end of the housing, a main shaft in said upper member, a driving pulley mounted on the end of said shaft adjacent the laterally projecting housing, a needle bar located at the outer end of said housing, actuating means therefor located in said housing, a looper and a feed dog at the free end of said work supporting arm, actuating means for the looper and feed dog extending through the work supporting arm and the vertical member and connected to said main shaft, and means for suspending said upper horizontal member and the parts carried thereby said last-named means comprising a base and a laterally projecting bracket carried at the upper end thereof and connected to said horizontal member at the side thereof.

11. A sewing machine comprising an upper horizontal member, a vertical depending member at one end thereof, a laterally projecting member at the other end thereof, a work supporting arm carried by the lower end of said vertical member and projecting laterally therefrom, and at an angle so that its free end is underneath the outer end of the housing, a main shaft in said upper member, a driving pulley mounted on the end of said shaft adjacent the laterally projecting housing, a needle bar located at the outer end of said housing, actuating means therefor located in said housing, a looper and a feed dog at the free end of said work supporting arm, actuating means for the looper and feed dog extending through the work supporting arm and the vertical member and connected to said main shaft, means for suspending said upper horizontal member and the parts carried thereby, said suspending means comprising a standard located at one side of said members, said standard having a vertical portion and a laterally extending portion said laterally extending portion being connected at its upper end to said upper horizontal member whereby the parts carried by said horizontal member are spaced from said standard so as to give the operator access to the side of the work supporting arm adjacent the standard.

12. A sewing machine comprising an upper horizontal member, a vertical depending member at one end thereof, a laterally projecting member at the other end thereof, a work supporting arm carried by the lower end of said vertical member and projecting laterally therefrom, and at an angle so that its free end is underneath the outer end of the housing, a main shaft in said upper member, a driving pulley mounted on the end of said shaft adjacent the laterally projecting housing, a needle bar located at the outer end of said housing, actuating means therefor located in said housing, a looper and a feed dog at the free end of said work supporting arm, actuating means for the looper and feed dog extending through the work supporting arm and the vertical member and connected to said main shaft, means for suspending said upper horizontal member and the parts carried thereby, said suspending means comprising a standard located at one side of said member, said standard having a vertical portion and a laterally extending portion, said laterally extending portion being connected at its upper end to said upper horizontal member where-

by the parts carried by said horizontal member are spaced from said standard so as to give the operator access to the side of the work supporting arm adjacent the standard, the face of said standard adjacent said work supporting arm being approximately parallel therewith.

13. A sewing machine comprising an upper horizontal member, a main shaft located therein, a housing projecting laterally from said member at one end thereof, a needle bar mounted to reciprocate in the outer end of said housing, a needle lever located in the housing and connected to the needle bar said main shaft having a crank therein, a link connecting said crank to said needle lever, said needle lever being pivoted intermediate its ends and extending to a position relative to said operating shaft so that when said needle lever is oscillated by the link connected to the crank on said actuating shaft, the needle bar will be moved to the upper end of its stroke when the actuating shaft moves through an arc less than one hundred and eighty degrees, and will be moved to the lower end of its stroke while the crank is moving through an arc considerably greater than one hundred and eighty degrees.

14. A sewing machine comprising an upper horizontal member, a main shaft located therein, a housing projecting laterally from said member at one end thereof, a needle bar mounted to reciprocate in the outer end of said housing, a needle lever located in the housing and connected to the needle bar said main shaft having a crank therein, a link connecting said crank to said needle lever, said needle lever being pivoted intermediate its ends and extending to a position relative to said operating shaft so that when said needle lever is oscillated by the link connected to the crank on said actuating shaft, the needle bar will be moved to the upper end of its stroke when the actuating shaft moves through an arc less than one hundred and eighty degrees, and will be moved to the lower end of its stroke while the crank is moving through an arc considerably greater than one hundred and eighty degrees, a vertical member depending from the opposite end of said upper horizontal member, a work supporting arm mounted at the lower end of said vertical member and projecting laterally therefrom with its free end under the outer end of said housing, a looper, and a feed dog at the free end of said work supporting arm, and means actuated from the main shaft in said upper horizontal member for operating the looper and the feed dog.

15. A sewing machine comprising an upper horizontal member, a main shaft located therein, a housing projecting laterally from said member at one end thereof, a needle bar mounted to reciprocate in the outer end of said housing, a needle lever located in the housing and connected to the needle bar said main shaft having a crank therein, a link connecting said crank to said needle lever, said needle lever being pivoted intermediate its ends and extending to a position relative to said operating shaft so that when said needle lever is oscillated by the link connected to the crank on said actuating shaft the needle bar will be moved to the upper end of its stroke when the actuating shaft moves through an arc less than one hundred and eighty degrees, and will be moved to the lower end of its stroke while the crank is moving through an arc considerably greater than one hundred and eighty degrees, and means connected to said upper horizontal member for suspending the same and the parts carried thereby.

16. A sewing machine comprising an upper horizontal member, a main shaft located therein, a housing projecting laterally from said member at one end thereof, a needle bar mounted to reciprocate in the outer end of said housing, a needle lever located in the housing and connected to the needle bar said main shaft having a crank therein, a link connecting said crank to said needle lever, said needle lever being pivoted intermediate its ends and extending to a position relative to said operating shaft so that when said needle lever is oscillated by the link connected to the crank on said actuating shaft, the needle bar will be moved to the upper end of its stroke when the actuating shaft moves through an arc less than one hundred and eighty degrees, and will be moved to the lower end of its stroke while the crank is moving through an arc considerably greater than one hundred and eighty degrees, a vertical member depending from the opposite end of said upper horizontal member, a work supporting arm mounted at the lower end of said vertical member and projecting laterally therefrom with its free end under the outer end of said housing, a looper, and a feed dog at the free end of said work supporting arm, means actuated from the main shaft in said upper horizontal member for operating the looper and the feed dog, and a laterally extending bracket formed integral with said upper horizontal member from end to end thereof for suspending said upper horizontal member and the parts carried thereby.

17. A sewing machine comprising an upper horizontal member, a main shaft located therein, a housing projecting laterally from said member at one end thereof, a needle bar mounted to reciprocate in the outer end of said housing, a needle lever located in the housing and connected to the needle bar said main shaft having a crank therein, a link connecting said crank to said needle lever, said needle lever being pivoted intermediate its ends and extending to a position relative to said operating shaft so that when said needle

lever is oscillated by the link connected to the crank on said actuating shaft the needle bar will be moved to the upper end of its stroke when the actuating shaft moves through an arc less than one hundred and eighty degrees, and will be moved to the lower end of its stroke while the crank is moving through an arc considerably greater than one hundred and eighty degrees, a vertical member depending from the opposite end of said upper horizontal member, a work supporting arm mounted at the lower end of said vertical member and projecting laterally therefrom with its free end under the outer end of said housing, a looper, and a feed dog at the free end of said work supporting arm, means actuated from the main shaft in said upper horizontal member for operating the looper and the feed dog, a laterally extending bracket formed integral with said upper horizontal member from end to end thereof for suspending said upper horizontal member and the parts carried thereby, said bracket being formed as a part of a standard located at one side of said work supporting arm and spaced therefrom whereby the operator has access to both sides of said work supporting member.

18. A sewing machine comprising a main frame having a depending member and a work supporting arm carried thereby, said work supporting arm being disposed in a vertical plane intersecting the vertical plane containing the longitudinal axis of the main frame and said depending member at an acute angle whereby the free end of the work supporting arm is visible to the operator, a base having an overhanging bracket supporting said main frame from one side of said frame and leaving the work supporting arm without lateral support and freely accessible on both sides thereof.

19. A sewing machine frame consisting of a base portion having an upwardly and laterally projecting overhang carrying shaft bearings, said overhang being provided adjacent one end thereof with a laterally extending portion adapted to support a needle operating mechanism, and adjacent the other end thereof with a depending vertical portion, and a work supporting arm extending from the lower end of said depending portion to a point beneath the aforesaid laterally extending portion whereby said work supporting arm is suspended and positioned relative to said base portion so as to be accessible at both sides thereof, and the free end of said arm visible to the operator.

20. A frame for sewing machines comprising a supporting base having the upper end thereof overhanging the adjacent lower portion of said base, bearings adapted to support a rotating shaft carried by the outer end of said overhanging portion of the supporting base, a support for a vertically reciprocating needle bar extending forwardly of said bearings and carried by said overhanging portion of the supporting base, a vertical depending support located at a distance from said needle bar support and carried by the overhanging portion of said supporting base, a work supporting arm carried by said depending member and having the free end thereof terminating beneath the outer end of the support for the needle bar, whereby said work supporting arm is suspended and positioned relative to said base portion so as to be accessible at both sides thereof, and the free end of said arm visible to the operator.

21. A sewing machine frame consisting of a base portion having an upwardly and laterally projecting overhang carrying shaft bearings, said overhang being provided adjacent one end thereof with a laterally extending portion adapted to support a needle operating mechanism, and adjacent the other end thereof with a depending portion and a work supporting arm extending from the lower end of said depending portion to a point beneath the offset laterally extending portion, said base portion having the face thereof adjacent said work supporting arm curved away from said arm whereby added space or clearance is provided for the arm of the operator.

22. A sewing machine frame consisting of a base portion having an upwardly and laterally projecting overhang carrying shaft bearings, said overhang being provided adjacent one end thereof with a laterally extending portion adapted to support a needle operating mechanism, and adjacent the other end thereof with a depending portion and a work supporting arm extending from the lower end of said depending portion to a point beneath the offset laterally extending portion, said base portion having the face thereof adjacent said work supporting arm curved away from said arm whereby added space or clearance is provided for the arm of the operator, said face of the base adjacent said work supporting arm being approximately parallel therewith.

23. A sewing machine frame consisting of a base portion having an upwardly and laterally projecting overhang carrying shaft bearings, said overhang being provided adjacent one end thereof with a laterally extending portion adapted to support a needle operating mechanism and adjacent the other end thereof with a depending portion, a work supporting arm extending from the lower end of said depending portion to a point beneath the offset laterally extending portion, the longitudinal axis of said work supporting arm being disposed in a vertical plane intersecting the vertical plane containing the axis of the actuating shaft in a line substantially centrally of the depending member.

24. The combination of a supporting base

having an overhanging bracket shaped and positioned so as to permit the arm of the operator to pass beneath the same for directing the material being stitched, a sewing machine unit supported at the outer end of said bracket including an upper frame member, a main actuating shaft located therein, means for supporting a needle bar adjacent one end of said actuating shaft, a work supporting arm having the free end thereof disposed beneath the needle bar supporting means, means carried by the frame at the opposite end of the shaft for suspending said work supporting arm, said work supporting arm being disposed in a vertical plane intersecting a vertical plane containing the main actuating shaft at an acute angle at the suspended end of said arm, whereby the free end of the work supporting arm is made visible to the operator.

25. The combination of a supporting base having an overhanging bracket shaped and positioned so as to permit the arm of the operator to pass beneath the same for directing the material being stitched, a sewing machine unit supported at the outer end of said bracket including an upper frame member, a main actuating shaft located therein, a laterally projecting support at one end of said upper frame member, a needle bar mounted at the outer end thereof, means for reciprocating the needle bar, a work supporting arm having its free end terminating beneath the outer end of said laterally projecting support, a member carried at the opposite end of the upper frame member from the projecting support for the needle bar and connected to and supporting said work supporting arm, said last-named member being so disposed that the operating means for the parts in the work supporting arm and extending through said member may be directly connected to the main actuating shaft, said work supporting arm and said upper frame member being so disposed relative to each other that the free end of the arm is visible to an operator positioned adjacent the suspended end of the work supporting arm and in line therewith.

26. The combination of a supporting base having an overhanging bracket shaped and positioned so as to permit the arm of the operator to pass beneath the same for directing the material being stitched, a sewing machine unit supported at the outer end of said bracket including an upper frame member, a main actuating shaft located therein, means adjacent one end of said shaft for supporting a needle bar, means directly connected to said shaft for reciprocating said needle bar, a work supporting arm having the free end thereof disposed beneath the means for supporting the needle bar, means carried by the support for the main actuating shaft adjacent the opposite end of the needle bar for supporting and suspending said work supporting arm, said last-named means being so constructed that the operating devices for the parts in the work supporting arm and extending through said supporting means may be directly connected to the main actuating shaft, said work supporting arm and said upper frame member being so disposed relative to each other that the free end of the arm is visible to an operator positioned adjacent the suspended end of the work supporting arm and in line therewith.

27. A sewing machine comprising an upper frame member, a main shaft disposed therein, a laterally extending portion at one end of said frame member and shaft adapted to support a needle bar, a work supporting arm terminating beneath the outer end of the laterally extending portion, means at the other end of said frame member for suspending said work supporting arm, a driving pulley on said main shaft at the end thereof adjacent the needle bar, the other end of said main shaft terminating within the end of said upper frame member, a supporting base including an upwardly and laterally projecting bracket located at one side of and attached to said upper frame member for supporting and suspending the same and the parts carried thereby, said work supporting arm being spaced from said bracket to provide a clearance space for the material being stitched and the arm of the operator for guiding the material along the work supporting arm.

28. A sewing machine comprising an upper frame member, a main shaft disposed therein, a laterally extending portion at one end of said frame member and shaft adapted to support a needle bar, a vertically disposed depending member at the other end of said upper frame member, a work supporting arm mounted at the lower end of said depending member and terminating beneath the outer end of the laterally extending portion, a driving pulley on said main shaft at the end thereof adjacent the needle bar, the other end of said main shaft terminating within the end of said upper frame member, a supporting base including an upwardly and laterally projecting bracket located at one side of and attached to said upper frame member for supporting and suspending the same and the parts carried thereby, said work supporting arm being spaced from said bracket to provide a clearance space for the material being stitched and the arm of the operator for guiding the material along the work supporting arm.

29. A sewing machine frame comprising an upper horizontal member in which is disposed an actuating shaft, a laterally extending portion at one end of said horizontal member, a depending member at the other end thereof, a work supporting arm extending from the

lower end of said depending portion to a point beneath the aforesaid laterally extending portion, and a base including an upwardly and laterally projecting bracket from which said frame is hung, said laterally extending portion being positioned on the opposite side of said horizontal member from the bracket and extending outwardly therefrom.

30. A sewing machine frame comprising an upper horizontal member, a laterally extending portion at one end thereof, a depending member at the other end thereof, a work supporting arm extending from the lower end of said depending portion to a point beneath the aforesaid laterally extending portion, and a base including an upwardly and laterally projecting bracket from which said frame is hung, said upper horizontal member being positioned at a sufficient angle to the bracket to allow free space for the arm of the operator between the bracket and said frame.

In testimony whereof, we affix our signatures.

NORMAN V. CHRISTENSEN.
HAROLD J. LE VESCONTE.