

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.
8 SHEETS—SHEET 1.

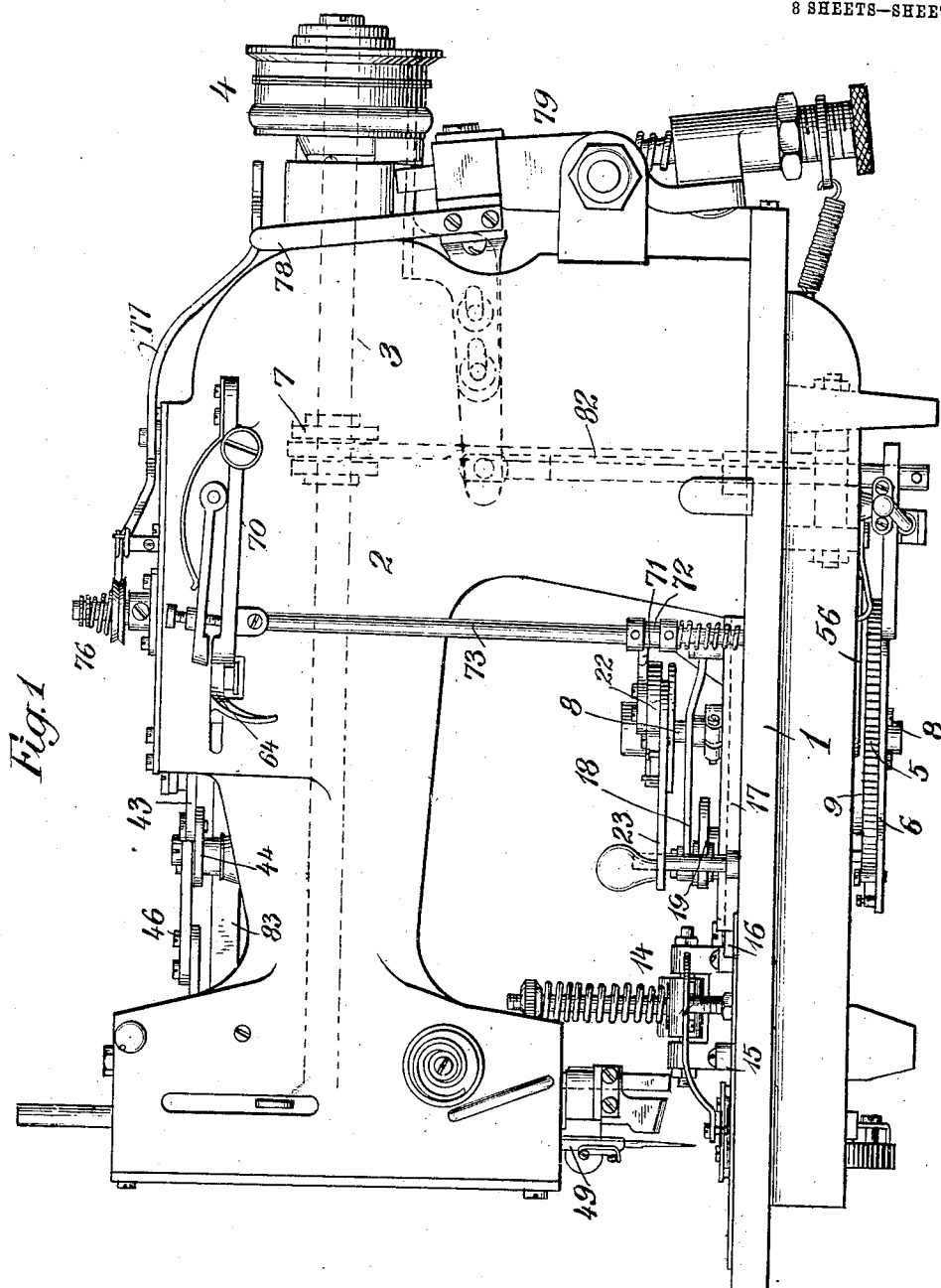


Fig. 1

WITNESSES:

Lyman Schreyer Jr.
J. C. Hartmann

INVENTOR

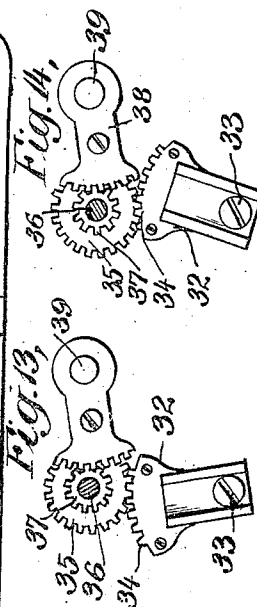
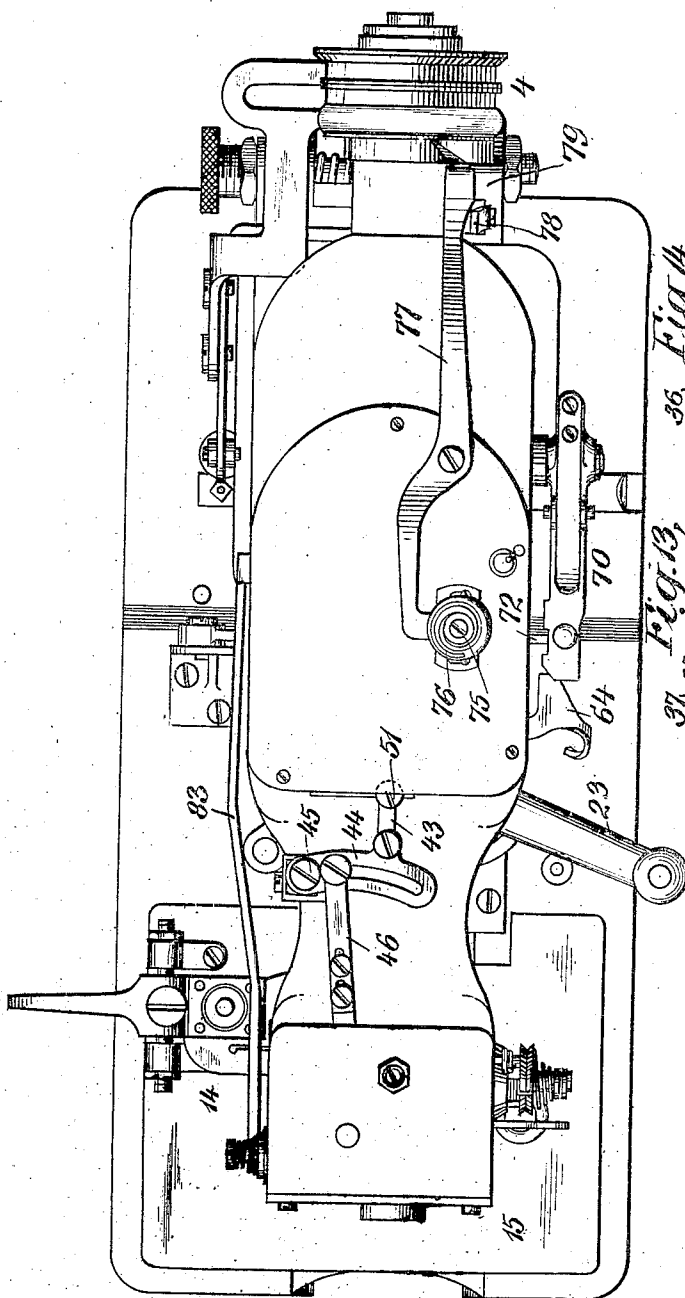
James T. Hogan
BY
Chapman & Hyatt
his ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.
8 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

Lyman S. Andrews Jr.
J. C. Hartmann

INVENTOR

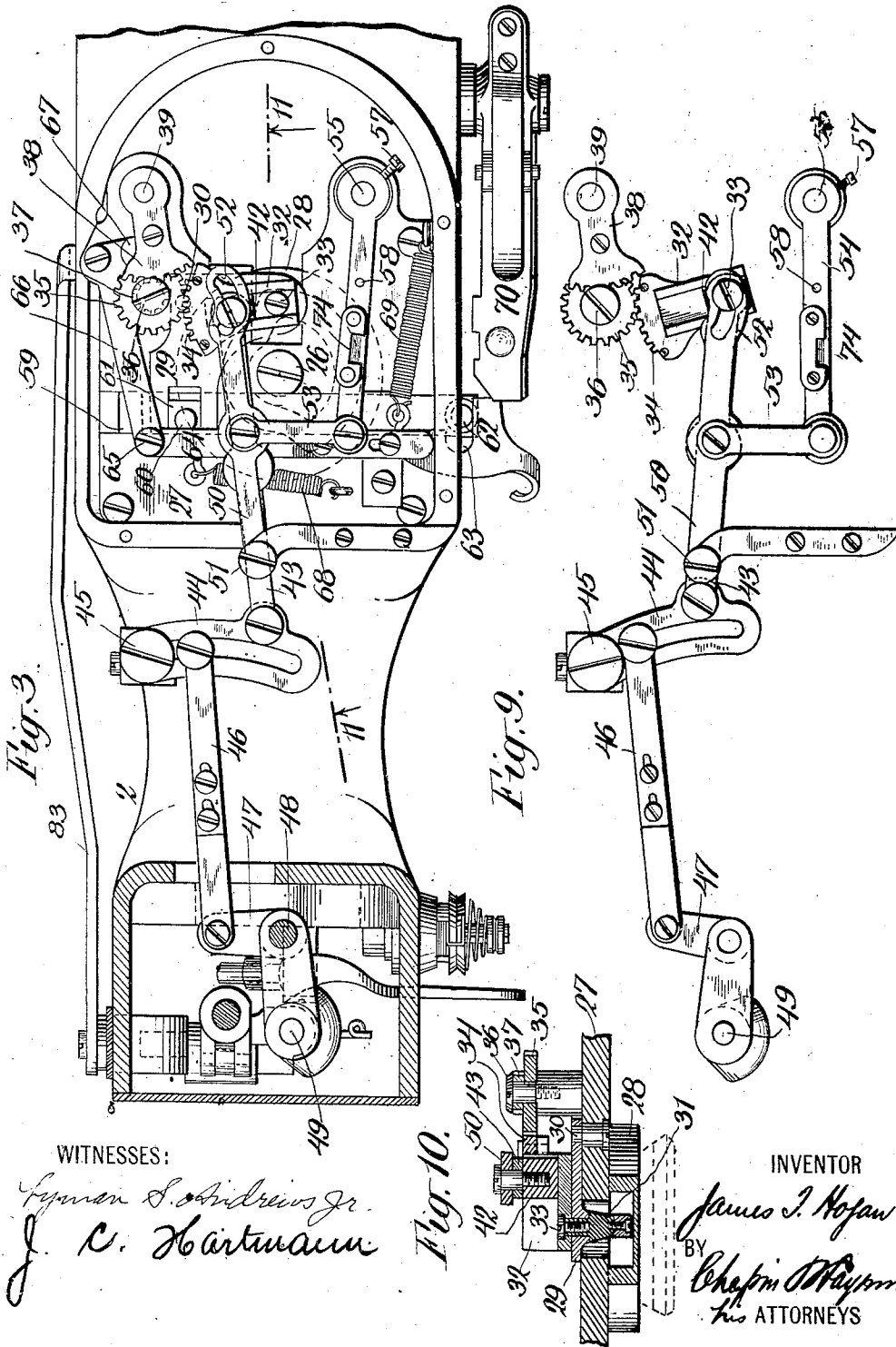
James T. Hogan
BY
Chapin & Thompson
his ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.

8 SHEETS—SHEET 3.



WITNESSES:

Lyman S. Andrews Jr.
J. C. Hartmann

INVENTOR

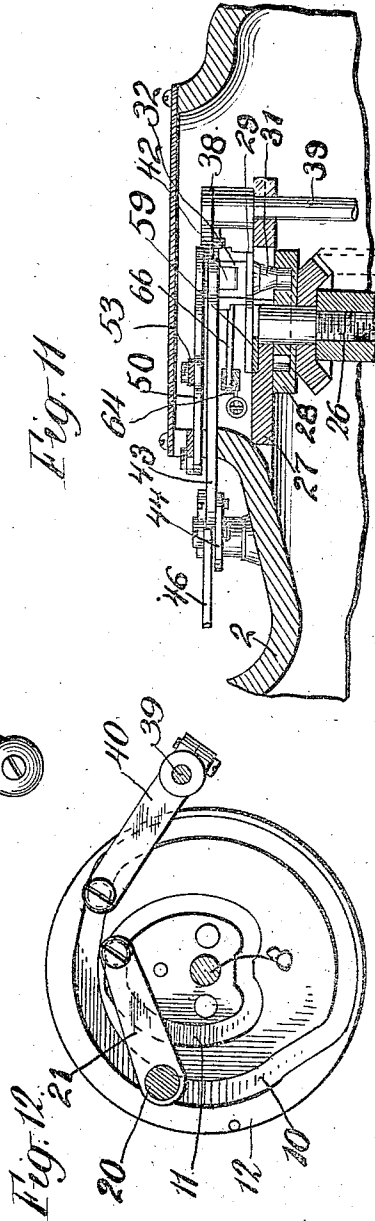
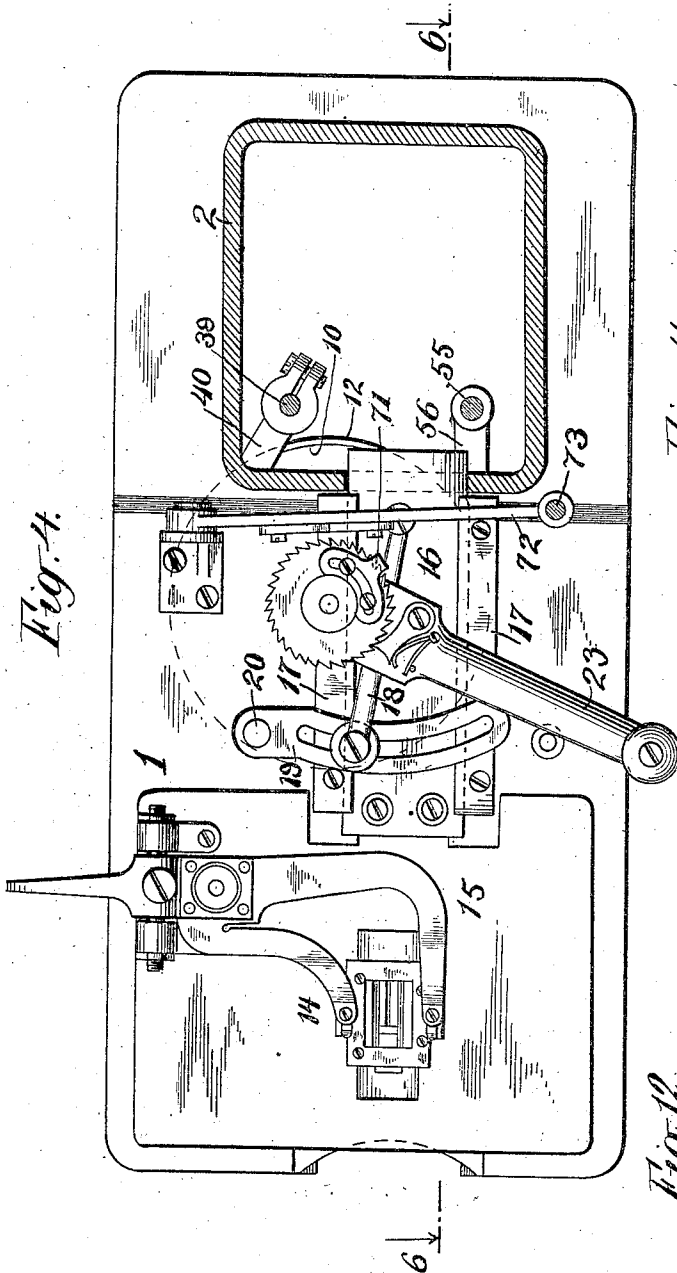
James T. Hogan
BY *Chapman & Raymond*
ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.

8 SHEETS—SHEET 4.



WITNESSES:

Gymen S. Andrews
J. C. Hartmann

INVENTOR

James T. Hogan
BY *Chapin Maynard*
his ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.

8 SHEETS—SHEET 5.

Fig. 5.

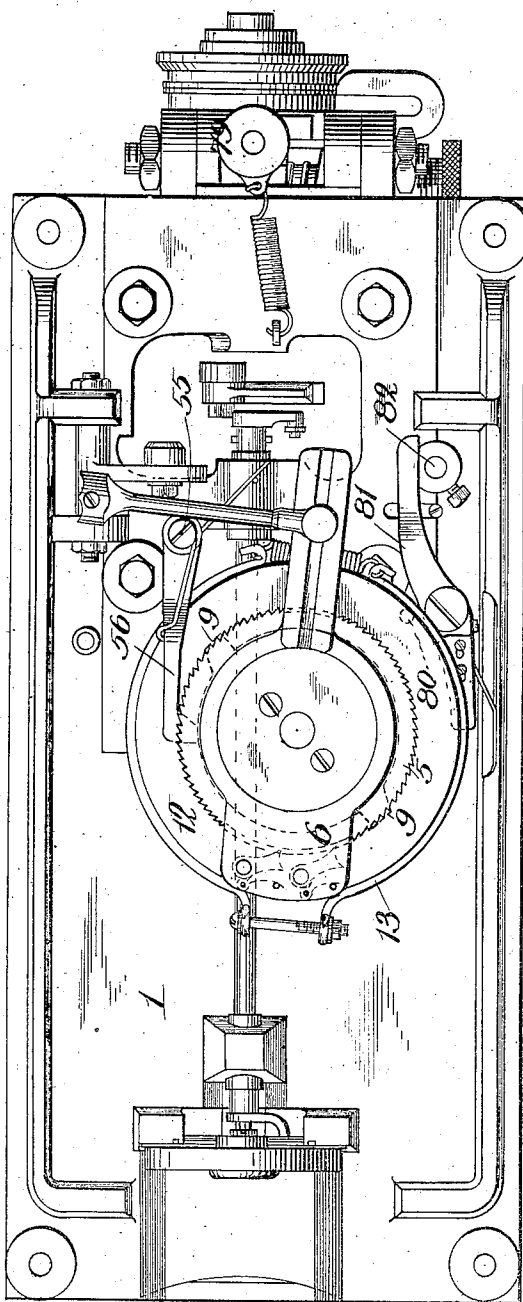
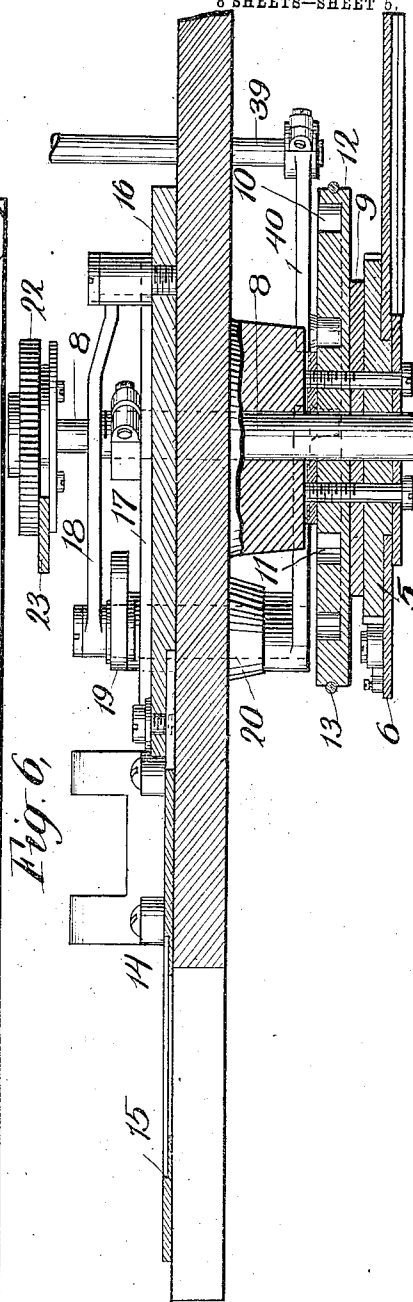


Fig. 6.



WITNESSES:

Gyman S. Andrews Jr.
J. C. Hartmann

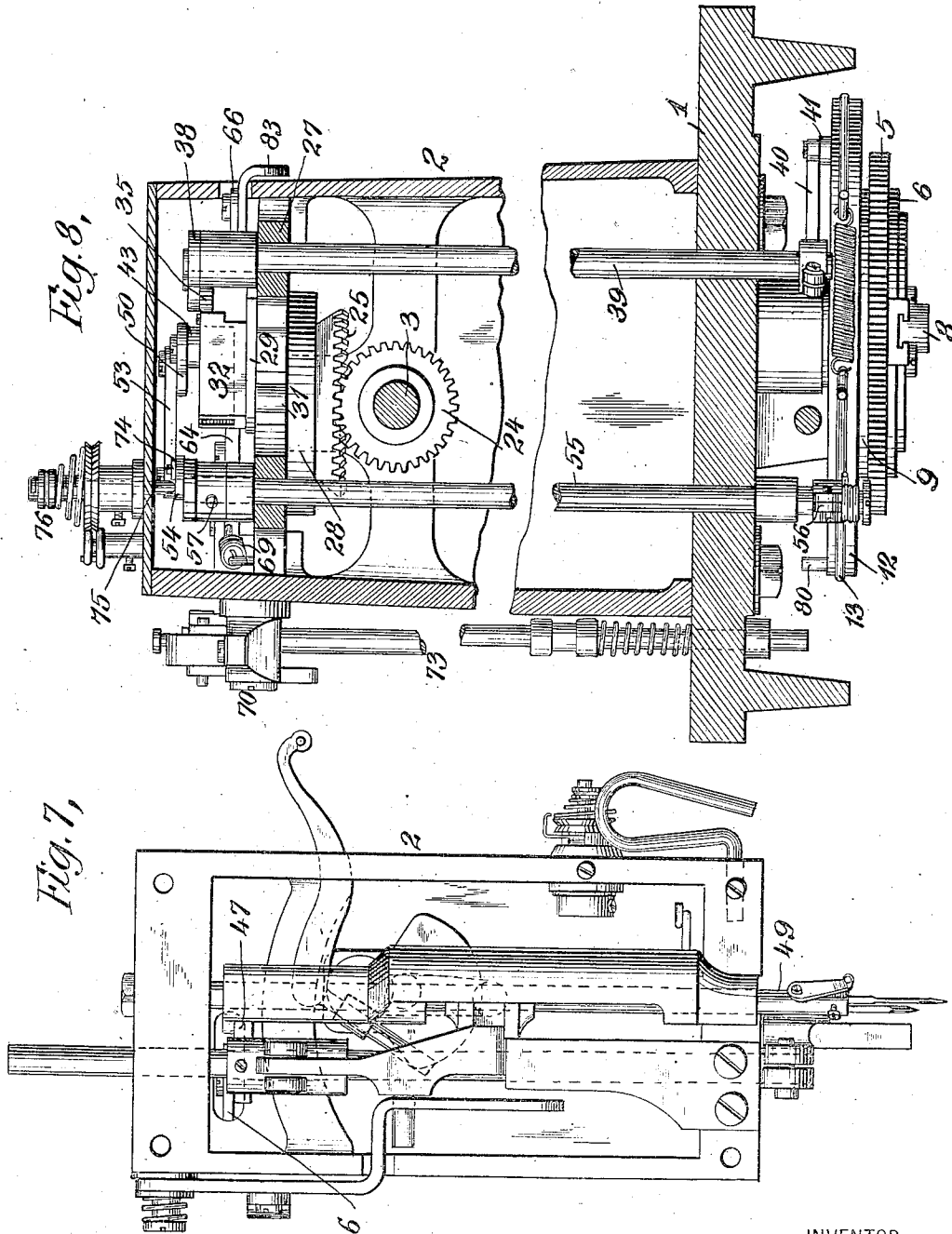
INVENTOR

James T. Hogan
BY
Chapin Raymond
his ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.
8 SHEETS—SHEET 6.



WITNESSES

Lyman S. Andrews Jr.
J. C. Hartmann

INVENTOR

James T. Hogan
BY
Chapin Raymond
his ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.
8 SHEETS—SHEET 7.

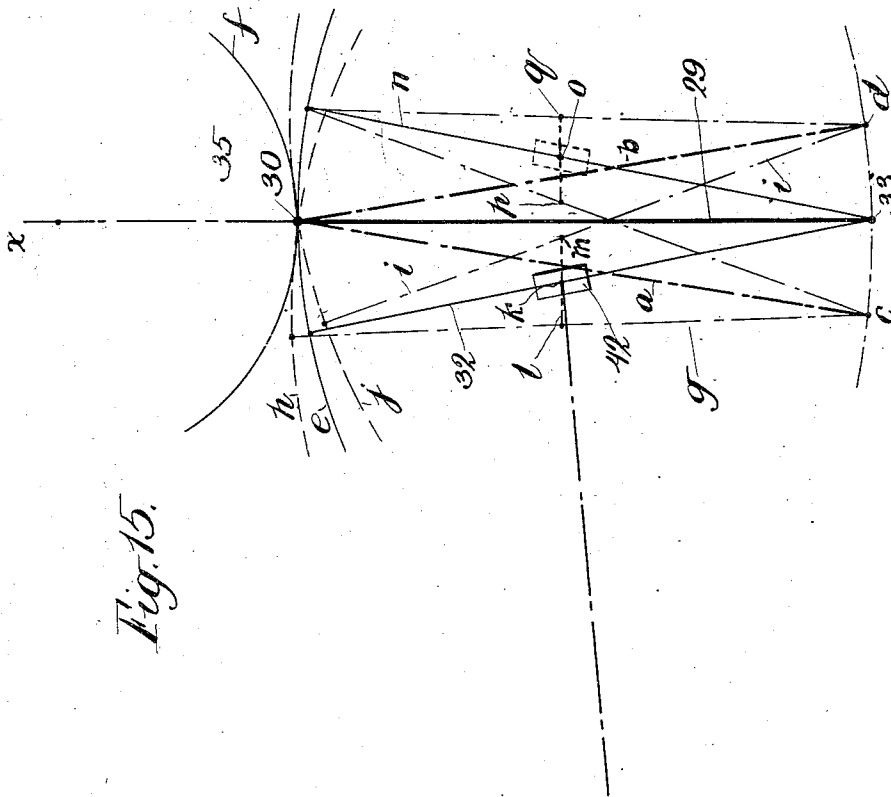


Fig. 15.

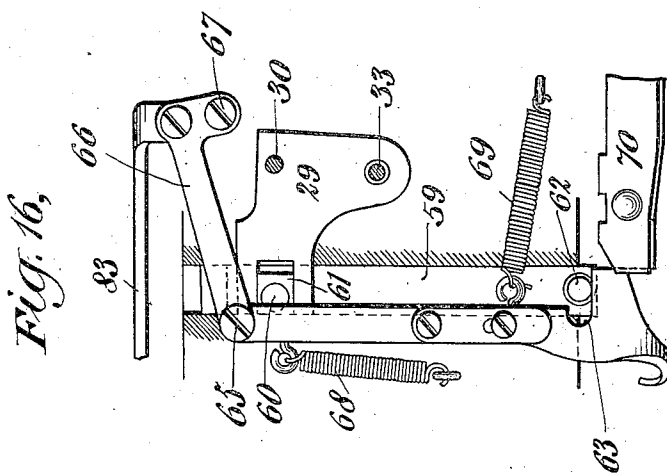
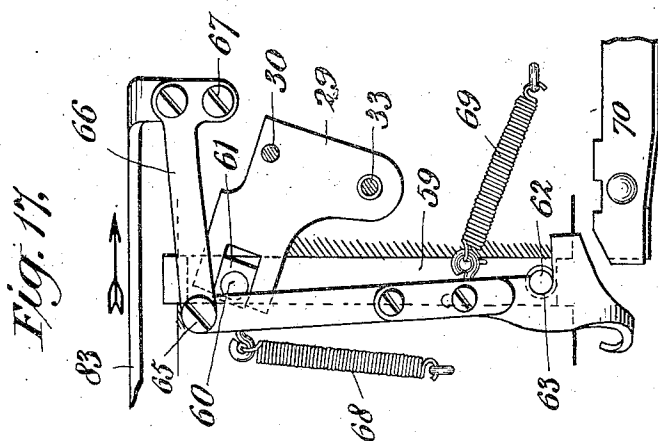
WITNESSES:
Gyman S. Andrews Jr.
J. R. Hartmann

INVENTOR
James T. Hogan
BY
Chapin Hayward
his ATTORNEYS

935,847.

J. T. HOGAN.
SEWING MACHINE.
APPLICATION FILED NOV. 5, 1908.

Patented Oct. 5, 1909.
8 SHEETS—SHEET 8.



WITNESSES:

Lyman S. Andrews Jr.
J. C. Hartmann

INVENTOR

James T. Hogan
BY
Chapin & Maynard
HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES T. HOGAN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE NATIONAL MACHINE COMPANY, OF MAMARONECK, NEW YORK, A CORPORATION OF NEW YORK.

SEWING-MACHINE.

935,847.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed November 5, 1908. Serial No. 461,122.

To all whom it may concern:

Be it known that I, JAMES T. HOGAN, a citizen of the United States of America, and a resident of Jersey City, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines; of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to sewing machines, and particularly to buttonhole sewing machines.

The main object of my invention is to provide a simple and strong form of sewing machine for stitching square end, round end, or other forms of button holes at will, the various movements being of such a nature as to permit of the running of the machine at very high speeds.

Another object of my invention is to so construct the parts and arrange their movements as to reduce to a minimum the wear thereof, and also to reduce friction of the moving parts so as to facilitate the easy running of the same.

In carrying out my invention, I provide means for feeding the work forward and backward in right lines, needle mechanism, and means for shifting the field of operation of the needle mechanism so as to produce stitching on either side of the button hole at will, and at the end of the button hole in the manner desired.

For forming barring stitches at the end of the button hole, I provide means for lengthening the throw of the jogging movements of the needle upon opposite sides of a neutral line, the side stitching being arranged to be carried out first upon one side of the neutral line and then on the other side thereof. At the time the barring stitches are to be made, I move the movement-transmitting means to a neutral point with respect to a guide which is shifted to change the field of movements of stitching from one side of the said neutral line to the other. This enables the shifting movement to be effected slowly and without shock to the parts, because, in such case, the shifting movement in no wise affects the relative position of the barring stitches, and may hence be carried out while the barring stitches are being effected.

My invention also consists in certain novel features of construction and combination of parts, as will hereinafter be fully set forth.

In order that my invention may be thoroughly understood, I will now proceed to describe an embodiment thereof with reference to the accompanying drawings illustrating the same, and will then point out the novel features in claims.

In the drawings, Figure 1 is a view in side elevation of a sewing machine embodying my invention. Fig. 2 is a top view thereof. Fig. 3 is a top view partly in horizontal section and with the cover plate which incloses certain mechanism in the overhanging arm, removed. Fig. 4 is a view in horizontal section showing the top plate and parts thereon, the section being taken through the uprising part of the overhanging arm. Fig. 5 is a bottom view of the machine. Fig. 6 is a detail view in vertical longitudinal section through the base of the machine, the plane of section being taken substantially upon the line 6-6 of Fig. 4. Fig. 7 is a view in front elevation of the end of the overhanging arm and parts contained therein, the cover plate thereof being removed. Fig. 8 is a view of the machine in transverse vertical section, the plane of such section being transversely through the uprising portion of the overhanging arm of the machine. Fig. 9 is a view of certain parts illustrated in Fig. 3, the said parts including the means transmitting movements to, and controlling the movements of, the vibrating gate which carries the needle bar, the parts in Fig. 9 being shown in different positions from that in which they are shown in Fig. 3. Fig. 10 is a detail view in transverse section of certain parts shown in Fig. 3, including the cam for producing the jogging movements of the needle for over-seaming stitches, the vibrating member operated thereby, the guide and sector carried by said vibrating member, the pinion for shifting the positions of the guide, and certain other correlated parts. Fig. 11 shows a detail view in transverse section of the same parts shown in Fig. 10, together with other correlated parts, the plane of section being taken substantially upon the line 11-11 of Fig. 3. Fig. 12 is a detail face view of two of the cams employed, together with certain cor-

related parts. Figs. 13 and 14 are face views of certain parts comprised in the means for controlling the field of movements of the needle bar, said parts being shown in one view in the position they will assume when the field of movements is adjusted for stitching upon one side of a button hole, and in the other view in the position they will assume when the field of movements is adjusted for stitching upon the other side of the button hole. Fig. 15 is a diagrammatic view illustrating the lines of movements of certain parts, the parts and movements being represented by lines and dots. Fig. 16 is a detail top view of certain parts of the cutter tripping mechanism, showing the same in the position in which they are shown in Fig. 3 but segregated from other parts of the machine. Fig. 17 is detail top view of the same parts showing them in other positions.

The machine comprises the usual bed 1 and overhanging arm 2. Mounted to rotate in the overhanging arm 2 is the main shaft 3 driven by a suitable pulley or band wheel 4. From this drive shaft all the moving parts of the machine derive their power.

Beneath the base plate of the machine (see particularly Figs. 5, 6 and 8) is a ratchet wheel 5 to which is imparted a step by step movement by means of a vibrating-pawl-carrying plate 6 connected by means of suitable links and levers with an eccentric or crank arm 7 upon the drive shaft 3. The said ratchet wheel is mounted to rotate with a stub shaft 8, and, rigidly secured to said ratchet wheel, whereby they will positively rotate therewith, are cams 9, 10 and 11. The cams 10 and 11 are formed in one piece, being face grooves in a member or disk 12, and a spring pressed band 13 surrounds the said member or disk 12, acting as a brake to prevent movements of the parts other than the movements positively given thereto by the feeding movements of the pawl carrying plate 6.

The cam 11 is substantially a heart-shaped cam with dwell portions, and is employed for the purpose of bringing about the feeding movements of the work operated upon. The work is supported by means of a work clamp 14, the work supporting plate 15 of which is secured to a plate 16, mounted to slide longitudinally in guideways 17 upon the base plate 1 of the machine. This sliding plate 16 is connected by means of a link 18 with a slotted arm 19, rigidly secured upon a rock shaft 20. The connection of the link 18 with the arm 19 being in the slotted portion thereof, adjustment is permitted to vary the throw of movement of the work plate and hence to regulate the extent of feeding movement imparted to the work. The rock shaft 20 penetrates the bed plate of the machine, and is provided upon its under side

with an arm 21, the said arm carrying a cam follower which engages the heart-shaped cam groove 11 above referred to. The shape of the cam is such as to give the work a steady and uniform movement first in one direction and then in the other, with a slight dwell between the said reverse movements during which time barring stitches may be accomplished at the extremities of the button hole.

The shaft 8 which carries the ratchet wheel 5 and the cams, extends through the base plate 1 of the machine to the other side thereof, and at its upper end is provided with an actuating ratchet wheel 22 adapted to be manually operated by means of a pawl carrying hand lever 23. By means of this hand lever the cams may be manually rotated when desired, irrespective of the rotation of the drive shaft 3.

I will now describe the parts relating to the means for transmitting vibratory or jogging movements to the needle to produce over-seaming stitches, and to the means for controlling and regulating the field and extent of such movements, so that the stitching may take place upon either side of the central line of the button hole at will, and at the ends of the button hole, the stitches at the ends of the button hole being barring stitches of greater length than the side stitches if desired, such as are common in the form of button hole known as square-end button holes.

The main shaft 3 is provided with a bevel gear wheel 24, arranged in mesh with another bevel gear wheel 25 mounted upon a vertical stud 26 secured to a stationary part located in the hollow arm 22, the axis of the stud disposed at right angles to the axis of the shaft 3. Fast to the bevel gear wheel 25 is a cam 28, which I will term hereinafter the vibratory cam. This cam is the one which imparts the jogging or vibrating movements to the needle bar to produce the over-seaming stitches required. A plate or member 29 is located upon a stationary plate 27, being pivoted thereto by means of a pivotal stud 30. The plate or member 29 is provided with a downwardly projecting stud 31 upon which is mounted an anti-friction roller. The stud passes through an open slot in the plate 27, and is received within the groove of the cam 28. By this means the cam 28 in its rotation, is caused to impart a vibratory or rotary reciprocating movement to the plate or member 29 about its pivot 30. The vibrating plate or member 29 carries a guide piece 32, such guide piece being attached to the plate or member by means of a screw 33 which forms a pivot for the guide piece 32 upon the same. At its opposite ends the guide piece is provided with gear teeth 34 constituting a gear sector, the center of which is concentric with the axial center 33. The pitch line of the gear

teeth 34 is co-incident at one point with the axis of the pivot 30.

A small gear wheel 35, mounted upon a stationary axis 36, is disposed with its teeth in mesh with the teeth of the gear sector 34. Secured to this gear wheel 35 is a small pinion 37, the teeth of which are in mesh with the teeth of a sector 38 rigidly mounted upon a vertical shaft 39. The vertical shaft 39 passes down through the uprising portion of the overhanging arm 2 to a point beneath the base of the machine, being provided at its lower end with an arm 40, the said arm carrying a stud and roller 41, constituting a cam follower, for the aforesaid cam 10. Rotation of the cam 10 will produce at intervals a rocking of the shaft 39 and consequently a movement of the sector 38. This will transmit movements through the pinion 37 and small gear wheel 35 to the guide piece 32, shifting the position of the same with respect to the vibrating plate or member 29, upon which it is mounted. This shifting movement will be a movement entirely independent of the vibrating movement which it derives from its connection with the plate 29, and it will be noted that the two movements in no way interfere with each other, its vibrating movement with the plate 29 merely causing the sector 34 to roll around the gear wheel 35, and the movement of the gear wheel 35 having no tendency to impart any movement to the plate 29 because of the fact that the pitch lines of the gear wheel and the sector 34 are both intersected by the axis of the pivot 30 upon which the plate 29 is mounted.

The guide piece 32 constitutes a support for a slide 42 mounted thereon and engaged to move with respect thereto toward and away from the axis of the pivot 33. This slide is connected pivotally to one end of a link 43, the other end of which is pivoted to a vibrating arm 44, pivoted at 45 to a stationary portion of the arm of the machine. The arm 44 is adjustably connected by means of a link 46 with an arm 47 secured to, or formed as a part of, the needle bar gate. The needle bar gate is pivoted upon centers 48, the needle bar 49 carried thereby partaking of the swinging movements of the gate, but having also the necessary longitudinally reciprocating movements common to sewing machine needle bars.

By means of the link and lever connections just explained, any movement given to the slide 42, lengthwise of the horizontal portion of the overhanging arm of the machine, will transmit a corresponding movement to the needle gate at about right angles thereof. Movements of this character are movements substantially longitudinal of the link 43, and hence vibratory movements of the vibrating arm 44. Such movements are transmitted through the link 46 to the arm

47 of the gate, and, as the pivotal connection between the link 46 and the arm 47 of the gate is at about right angles to the position of the needle bar in the gate, such movements, in being transmitted to the gate, are transmitted at substantially right angles thereto and hence transverse of a line longitudinally through the horizontal portion of the arm. By reference to the view of the machine shown in Fig. 4, it will be seen that the cloth clamp and other parts are so disposed as to support the work for the making of button holes with their central lines longitudinal with respect to the overhanging arm of the machine, and hence the jogging movements above described with reference to that portion of the gate holding the needle bar, will be transverse of such a line as will be well understood. The proportion of movement transmitted from the slide to the needle bar may be regulated by manual adjustment of the lever 46 along the slotted portion of the vibrating arm 44, such adjustment being made, however, before the commencement of the work and remaining the same during any one complete operation of producing a button hole. With this link properly adjusted before the machine commences to operate, variations in the length of stitch will only be effected during the running of the machine by a change of position of the slide 42 with respect to the pivotal center 33 of the guide piece 29.

The position of the slide 42 in the guideway of the guide piece 32 is controlled by means of a lever 50 disposed immediately above the link 43, being pivoted at 51 to a stationary point and engaging a screw connected with the slide by means of a slotted portion 52. Intermediate its ends the lever 50 is connected by means of a link 53 with an arm 54 secured upon a vertical shaft 55. The vertical shaft 55 extends downward through the uprising arm of the machine, penetrating the base of the machine to the under side thereof, and, beneath the base, is provided with an arm 56. This arm bears against the periphery of the cam 9 which I will hereinafter refer to as the barring cam. The barring cam, in the present example of my invention, has two oppositely disposed projections. When these projections engage the arm 56, the shaft 55 is rotated to an extent sufficient to draw the slide 42 down to a position opposite to, and substantially concentric with, the axial center 33 of the guide piece 32. At this point a sufficient range of jogging movement is imparted to the guide to transmit movements to the needle bar sufficient for barring stitches.

In order that the somewhat peculiar relationship of the movements of the vibrating plate or member 29 and the guide piece 32 be made plain, I will now refer to the diagrammatic view Fig. 15, in which the move-

ments of the parts are made clear by eliminating the confusion arising from their shape, form and configuration. In this view $x x$ represents a line centrally through the gear wheel 35 and pinion 36, the pivotal center 30 of the vibrating plate 29, and through the pivotal center 33 of the guide piece 32 upon the vibrating plate 29; when the said vibrating plate is in a position intermediate the extreme points of its throw in either direction. The pivotal center 30 is shown by a dot or point, as is also the pivotal center 33. The straight heavy line between the points 30 and 33 is employed to represent the vibrating plate or member 29, the broken lines $a b$ representing the extreme limit of throw of the said vibrating plate or member 29 about its pivotal center 30 under the influence of the vibratory cam 28. c and d designate the positions of the point 33 at such times. The guide piece is represented by a single straight line 32, which is shown as out of line with the line 29, having been moved to the left hand side thereof around its pivotal axis 33, and the sector portion thereof is represented by an arc e constituting the pitch line of said sector. The line e will be seen to engage at one point the line f , which represents the pitch line of the gear wheel 35. As the vibrating plate or member 29 swings to a position represented by the line a , the guide piece 32 will assume a position represented by the broken line g , the arc e rolling upon the circumference f until it assumes a position h ; while, when the vibrating plate or member 29 moves to a position represented by the line b , the guide piece 32 will move to a position represented by the broken line i , the arc e at this time assuming the position j . The slide 42 is shown with its center upon a point k along the line 32, and it will be apparent that, as the vibrating member vibrates backward and forward between the lines a and b , the point k will vibrate backward and forward between the points l and m along the broken lines g and i .

Besides assuming that the line $x x$ represents the central line of the parts, as above stated, the said line may also be taken to represent the central line of the button hole, because all vibratory movements of the slide 42 in a direction at right angles to the line $x x$ are transmitted proportionately to the needle bar in positions having the same proportionate relative positions to the central line of the button hole. The movement of the point k between the two points l and m will then represent side stitches upon one side of the central line $x x$ of the button hole.

By operation of the gear wheel 35 under actuation of the cam 10, the guide piece 32 is shifted from one side to the other of the central line $x x$. The broken line n indicates the position of the central line of the guide

piece 32 when thrown into a position upon the other side of the central line $x x$ to produce the other set of side stitches. The point o designates the position of the guide piece 42 upon the line n corresponding to the position k upon the line 32, while the points p and q represent the range of movement of the point o during the vibration of the plate or member 29. The distance between p and q will then represent the side stitches upon the opposite side of the button hole to the side stitches represented by the points l and m . The direction of feed of the work plate being in the longitudinal line of the button hole represented by the line $x x$, side stitches will be produced from end to end of the button hole as the work is moved in one direction or the other, the shift of the guide piece from one side of the central line to the other being effected while the work is in a position with the end of the button hole at a point in line with the needle bar. When either end of the button hole has been reached, barring stitches may be made, and for this purpose the cam 9 will operate to throw the slide 42 down to a position with its central point substantially co-incident with the center 33. Because this center vibrates between the points c and d , the distance $c d$ will represent the proportionate extent of the stitches produced, said stitches representing barring stitches equidistant upon opposite sides of the central line $x x$. Such barring stitches may be conveniently formed at both ends of the button hole, and for this reason the cam 9 is provided with two projections oppositely disposed, a single revolution of the said cam and ratchet to which it is secured, constituting a movement sufficient to complete one button hole.

It will be noted that, when the slide 42 is over the axial center 33, movement of the guide piece 32 upon the vibrating plate, being a movement around the axis 33, will impart no movement to the slide 42, the only movement imparted thereto being the regular vibrating movement of the plate 29 under the influence of the cam 28. For this reason the cam 11 may have very gradual change portions, the entire time occupied in barring being, if desired, occupied in moving the guide piece 32 from its position upon one side of the line $x x$ to its position upon the other. This arrangement enables the machine to be run at a high rate of speed and saves wear and tear on the parts due to shock arising from inertia and momentum.

It will also be seen that the machine may be very easily adapted for the purpose of making round end button holes, if desired, instead of square end button holes.

In Fig. 3 of the drawings the parts are shown in the position which they assume when stitching is being carried out on (say) the left hand side of the button hole, such as

is represented by the space between the points *l* and *m* of the diagram Fig. 15.

In Fig. 9 the slide 42 is shown as moved down to the position in the guide piece for transmitting movements suitable for barring stitches. When in this position barring movements are made such as is represented on the diagram between points *c* and *d*.

In Fig. 14, the guide is shown as thrown over to the opposite position, in which position stitching will take place on (say) the right hand side of the button hole, the same parts shown in Fig. 14 being shown in Fig. 13 in the first described position, such position corresponding to the position in which the parts are shown in Fig. 3. Barring may take place while the parts are in the position shown either in Fig. 13 or in Fig. 14, for, as above set forth, the relative position of the guide upon the vibrating plate or member does not materially affect the movement transmitted when the slide has been moved down to barring position.

For the purpose of making round end button holes it is only necessary to prevent the cam 9 from operating to shift the slide down to its barring position. This may be effected in a number of ways, but for purposes of simplicity of illustration, I have shown the arm 54 as secured to the shaft 55 by means of a set screw 57, by unscrewing which the said arm will be released from its engagement with the shaft, and I have provided the arm 54 with a pin 58 which by engagement with a stationary part of the machine may be employed to hold the said arm in its proper position to correctly locate the slide 42. With the slide 42 having no movement along the guide toward and away from its axial center 33, the cam 11, which controls the field of the over-seaming stitching operations upon opposite sides of the button hole, will carry the said field of movements gradually from one side to the other at the end of the button hole, making a round end button hole, as desired, and other shaped button holes may, of course, be made in accordance with the shape of the cam employed.

Mounted to slide transversely in a groove in the plate 27 is a bar 59, said bar provided with a stud 60 upon which is mounted a block 61. This block is received within a slotted portion of the plate or member 29, and, by reason of this connection, said bar 59 is caused to reciprocate at all times the said plate or member 29 is vibrated. Near one end the bar is provided with an uprising stud 62, which is arranged contiguous to, and is adapted at certain times to engage with, a notch 63 in a bar 64 comprising a portion of the cutter controlling mechanism. This bar is pivoted at 65 to a lever 66, said lever in turn pivoted at 67 to a stationary point on the plate 27. A coil spring 68,

connected with the bar 64, near its pivotal point 65, tends to pull the bar 64 longitudinally in one direction and to rock the lever 66 upon its pivotal center 67, and another coil spring 69 attached to the bar 64 near its opposite end tends to draw the bar laterally toward a tripping latch 70. The tripping latch 70 ordinarily holds the bar 64 in such a position as to prevent the notch 63 thereof from engaging the stud 62 upon the transverse bar 59. When this tripping latch is moved to its tripping position, as it may be by operation of a cam piece 71 secured upon the ratchet wheel 22, said cam piece acting through a lever 72 and a vertical rod 73, the bar 64 will be permitted to move inward under tension of the spring 69 so as to be engaged by the stud 62 when the same is opposite the notch 63. When this happens, the bar 64, upon the next reciprocating movement of the constantly reciprocating transverse bar 59, will be carried back therewith, such movement of the bar 64 having the effect of rocking the lever 66 upon its pivotal center 67. The lever 66 is pivotally connected to a cutter controlling bar 83, the cutter being caused to operate upon the next successive downward movement of the needle bar after the said bar has been tripped, and the tripping thereof is produced by the aforesaid movement of the lever 66 when the same is rocked upon its pivotal center 67 by the movement of the bar 64.

I will not describe the operation of the cutting mechanism with any further particularity herein, because no claim is made to the same *per se*, the mechanism being substantially such as is shown in Patent No. 402,610 to Osterhout & Haidenbeck, dated May 7th, 1889, for cutting device for buttonhole sewing machines.

The arm 54 is shown as provided with a cam plate 74, which engages with the lower end of the central stud 75 of a tension device 76, whenever the arm 54 is moved to a barring position. This will release the tension of the thread at such times as barring stitches are being made. I have also shown means in a lever 77, adapted to be actuated by a projection 78 upon the stop motion arm 79, for releasing the tension at the moment the machine is stopped. This stop motion, which may be of any suitable kind such as are well known and are on the market today, is tripped by means of a pin 80 projecting from the cam member 12, the said pin or projection being arranged to strike a lever 81, said lever controlling the position of a rod 82 connected with the said stop motion arm 79.

While the particular form of stop motion is not essential in the present application, a detailed description of the form herein illustrated may be found in U. S. Letters Patent, No. 894,073 of July 21st, 1908.

What I claim is:

1. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar comprising a plate or member arranged to vibrate about an axis, means for imparting a constant and uniform vibration thereto, movement transmitting means including a slide and a guide piece therefor supported upon said plate or member, means for moving the slide upon the guide piece toward and away from the axis of the plate or member so as to vary the amplitude of movements transmitted thereby, and means for moving the guide piece laterally with respect to the plate or member to vary the field of the shorter vibrating movements transmitted by the slide carried thereby, the relative movements permitted between the guide piece and the plate or member being such as not to affect the field of movements transmitted by the slide when in a position to transmit the said movements of greater amplitude.

2. A sewing machine including means for imparting relative jogging or lateral movements between the work and the needle bar in the formation of over-seaming stitches, said means comprising a vibrating plate or member, a guide piece pivotally carried upon the plate or member, and movement transmitting means including a slide mounted upon said guide piece,—means for moving the guide with respect to the vibrating plate or member to change the field of lateral or jogging movements transmitted by the guide thereon without necessarily changing the amplitude of movement transmitted thereby, and means for moving said slide upon said guide to vary the amplitude of the lateral or jogging movements transmitted thereby, the last said movement being to a point substantially neutral with respect to the movement of the guide piece upon the member carrying it, so that relative movements between the guide piece and the member carrying it during the transmission of the jogging movements of said greater amplitude will not affect or vary the field of movement of said lateral or jogging movements of greater amplitude.

3. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar comprising a plate or member arranged to vibrate about an axis, a guide piece pivoted upon said plate or member, the axis of said pivot being eccentric of the axis of vibration of the plate or member, movement transmitting means for imparting said relative jogging movements, including a slide mounted upon said guide, means for moving said slide upon said guide toward and away from the pivotal axis of the said plate or member to vary the amplitude of jogging

movements transmitted by the slide, and means for rocking the guideway upon its pivotal axis with respect to the plate or member upon which it is mounted to vary the field of movements transmitted by the slide mounted thereon.

4. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar comprising a plate or member arranged to vibrate about an axis, means for imparting a constant range of vibration to said plate or member about its axis, a guide piece pivoted upon said plate or member, the axis of said pivot being eccentric of the axis of vibration of the plate or member, movement transmitting means for imparting said relative jogging movements, including a slide mounted upon said guide, means for moving said slide upon said guide toward and away from the axis of the said plate or member to vary the amplitude of jogging movements transmitted by the slide, gear teeth upon said guide piece arranged concentrically of the axis thereof, and with their pitch line intersecting the axis of the plate or member, and a gear having teeth engaging the teeth of said guide piece, the pitch line of the teeth of said gear also intersecting the pivotal axis of said vibrating plate or member.

5. In a sewing machine, the combination with stitch forming mechanism including a vertically reciprocating and laterally vibrating needle bar, of means for transmitting the vibratory movements to the needle bar comprising a pivoted member, means for transmitting a constant range of vibration thereto, a guide piece laterally adjustable thereon which partakes of the movement of the said vibrating member, an element connecting the said guide piece with the said needle bar, means for shifting the position of the guide piece upon the pivoted vibrating member without thereby shifting the position of the said connecting element with respect to the said pivoted member, and means for moving the connecting element along the guide piece toward and away from the axis of the pivoted member.

6. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar, said means comprising a pivoted plate or member, means for imparting a constant range of vibration to said plate or member about its pivotal axis, a guide piece secured upon the plate or member to one side of its pivotal axis, movement transmitting means including a slide upon said guide piece, said slide arranged to be moved upon said guide piece toward and away from the pivotal center of the plate or member, whereby the range of lateral movements transmitted by the slide will be varied, and means for laterally adjusting the position of the guide

piece and slide with respect to the plate or member to vary the field of the jogging movements transmitted by the slide.

7. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar, said means comprising a pivoted plate or member, means for imparting a constant range of vibration to said plate or member about its pivotal axis, a guide piece pivoted upon said member at a point eccentric of the pivotal axis of said plate or member, movement transmitting means including a slide upon said guide piece, means for moving said slide backward and forward along the guide piece in a direction from one said pivotal center to the other and vice versa, the range of lateral movements transmitted by the slide being thereby varied, and means for adjusting the guide with respect to the plate or member, about the pivotal axis of said guide, thereby laterally adjusting the field of movements transmitted by the said slide.

8. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar, said means comprising a pivoted plate or member, a cam for imparting a constant range of vibration thereto about its pivotal axis, a guide piece pivotally secured upon said plate or member to one side of the pivotal axis thereof, a slide upon said guide piece for transmitting the said relative jogging movements, a cam, and connections therefrom to said slide to move same along said guide piece to vary the amplitude of jogging movements transmitted thereby, and a cam and connections therefrom to said guide piece for varying the position of said guide piece about its pivotal axis upon the plate or member to vary the field of the said relative jogging movements transmitted by the slide.

9. In a buttonhole sewing machine, the combination with stitch forming mechanism including a vertically reciprocating and laterally vibrating needle bar, of a vibrating plate or member for imparting said lateral vibrating movements to the needle bar, a pivotal support therefor which is stationary during the normal stitching operation for the production of a complete buttonhole, means for imparting a constant range of vibration to said plate or member about its pivotal axis, a guide piece upon the plate or member arranged to partake of the movements thereof, a slide upon said guide piece, means connecting said slide with said needle bar, means for moving said slide upon said guide piece in a direction toward and away from the pivotal center of the said plate or member whereby the amplitude of lateral movements transmitted by the slide will be varied between a degree sufficient to produce

side stitches and a degree sufficient to produce end barring stitches, and means for laterally adjusting the position of the guide piece with respect to the said plate or member while the slide is in a position wherein movements for producing barring stitches are being transmitted, without thereby laterally shifting the position of the said slide with respect to the vibrating plate or member.

10. In a button hole sewing machine, the combination with stitch forming mechanism including a vertically reciprocating and laterally vibrating needle bar, of a vibrating plate or member for imparting said lateral vibrating movements to the needle bar, means for imparting a constant range of vibration to said plate or member about its pivotal axis, a guide piece pivotally mounted upon said member to one side of the pivotal axis thereof, said guide piece arranged normally to partake of the movements of said plate or member, a slide upon said guide piece, means connecting the needle bar with said slide, means for moving the slide backward and forward between the pivotal center of the guide piece and the pivotal center of the plate or member to vary the amplitude of lateral movements transmitted by the slide, and means for adjusting the position of the guide piece upon the plate or member about the pivotal axis of the said guide piece to vary the field of movements imparted by the slide carried thereby when the slide is at any point between the two said pivotal axes.

11. In a button hole sewing machine the combination with stitch forming mechanism including a vertically reciprocating and laterally vibrating needle bar, of a vibrating plate or member for imparting said lateral vibrating movements to the needle bar, means for imparting a constant range of vibration to said plate or member about its pivotal axis, a guide piece pivotally mounted upon said member to one side of the pivotal axis thereof, said guide piece arranged normally to partake of the movements of said plate or member, a slide upon said guide piece, means connecting the needle bar with said slide, means for moving the slide backward and forward between the pivotal center of the guide piece and the pivotal center of the plate or member to vary the amplitude of lateral movements transmitted by the slide, and means for adjusting the position of the guide piece upon the plate or member about the pivotal axis of the said guide piece to vary the field of movements imparted by the slide carried thereby when the slide is at any point between the two said pivotal axes, said last named means comprising gear teeth carried by the guide, and a gear having teeth intermeshing therewith, the pitch lines of said

teeth being substantially coincident at one point with the axis of the vibrating plate or member.

12. In a button hole sewing machine, the combination with stitch forming mechanism including a vertically reciprocating and laterally vibrating needle bar, of a vibrating plate or member 29 pivoted to vibrate about an axis 30, a cam 28 for vibrating same, a guide piece 32 pivotally mounted at 33 upon said plate or member, said guide piece provided with gear teeth 34, a gear wheel 35 in mesh with said gear teeth 34, means for imparting rotative movement to said gear wheel in the operation of the machine, a slide 42 in said guide piece, means for moving said slide along said guideway in the operation of the machine, and connecting means between the said guide piece 42 and the needle bar whereby the vibrating movements imparted to said slide by said cam will be imparted to said needle bar to produce the laterally vibrating or jogging movements thereof.

13. In a button hole sewing machine, the combination with stitch forming mechanism including a vertically reciprocating and laterally vibrating needle bar of a plate or member arranged to vibrate about a vertical axis, a horizontal guide piece vertically pivoted upon said plate or member, a slide in said guide piece, means connecting said slide laterally with said needle bar, a cam arranged to rotate about a vertical axis, a vertical shaft having an arm at one end engaging said cam, and at the other end having an arm connected with said slide, whereby the operation of said cam will, through the intermediation of said vertical shaft, move said slide along said guide, another cam secured to rotate with the first said cam, a vertical shaft having an arm engaging said last named cam, and provided with means at its other end engaging said guide piece, whereby the cam, upon its movement, will, through the intermediation of said last named vertical shaft, move said guide piece about its axis upon the member upon which it is vibrated.

14. A sewing machine including means for imparting relative jogging movements between the work support and the needle bar comprising a plate or member arranged to

vibrate about an axis, movement transmitting means including a slide supported upon said plate or member, means for moving the slide upon the plate or member toward and away from the axis thereof so as to produce short jogging movements suitable for side stitching, and jogging movements of greater amplitude suitable for barring stitches, means for laterally moving the slide with respect to the plate or member to vary the field or position of the said short jogging movements suitable for side stitching, and means for disconnecting the means for moving the slide along the guide from operative engagement, at will, and for holding the slide in substantially one position in the guide, substantially as specified.

15. A button-hole sewing machine including means for imparting relative jogging movements between the work support and needle bar for the production of overseaming side stitches, mechanism for increasing the amplitude of the jogging movements for the production of barring stitches, field changing mechanism for shifting the field of operation of the side stitches, and means whereby the same is operated during the formation of consecutive barring stitches without thereby causing any corresponding change in the position of the said barring stitches.

16. A buttonhole sewing machine including means for imparting relative jogging movements between the work support and needle bar, for the production of overseaming side stitches, field changing mechanism for shifting the field of operation of the side stitches, means for increasing the amplitude of the said jogging movements to produce sets of end barring stitches, and means for operating the field changing mechanism continuously during the production of substantially all of a set of said end barring stitches, to shift the field of operation of the side stitches from one side of the buttonhole to the other, without thereby producing any corresponding lateral changes in the position of the said end barring stitches.

JAMES T. HOGAN.

Witnesses:

D. HOWARD HAYWOOD,
LYMAN S. ANDREWS, Jr.