No. 671,680. Patented Apr. 9, 1901.

W. N. PARKES.

ORNAMENTAL STITCH SEWING MACHINE.

(Application filed Jan. 7, 1899.)

(No Model.) 5 Sheets—Sheet 1.

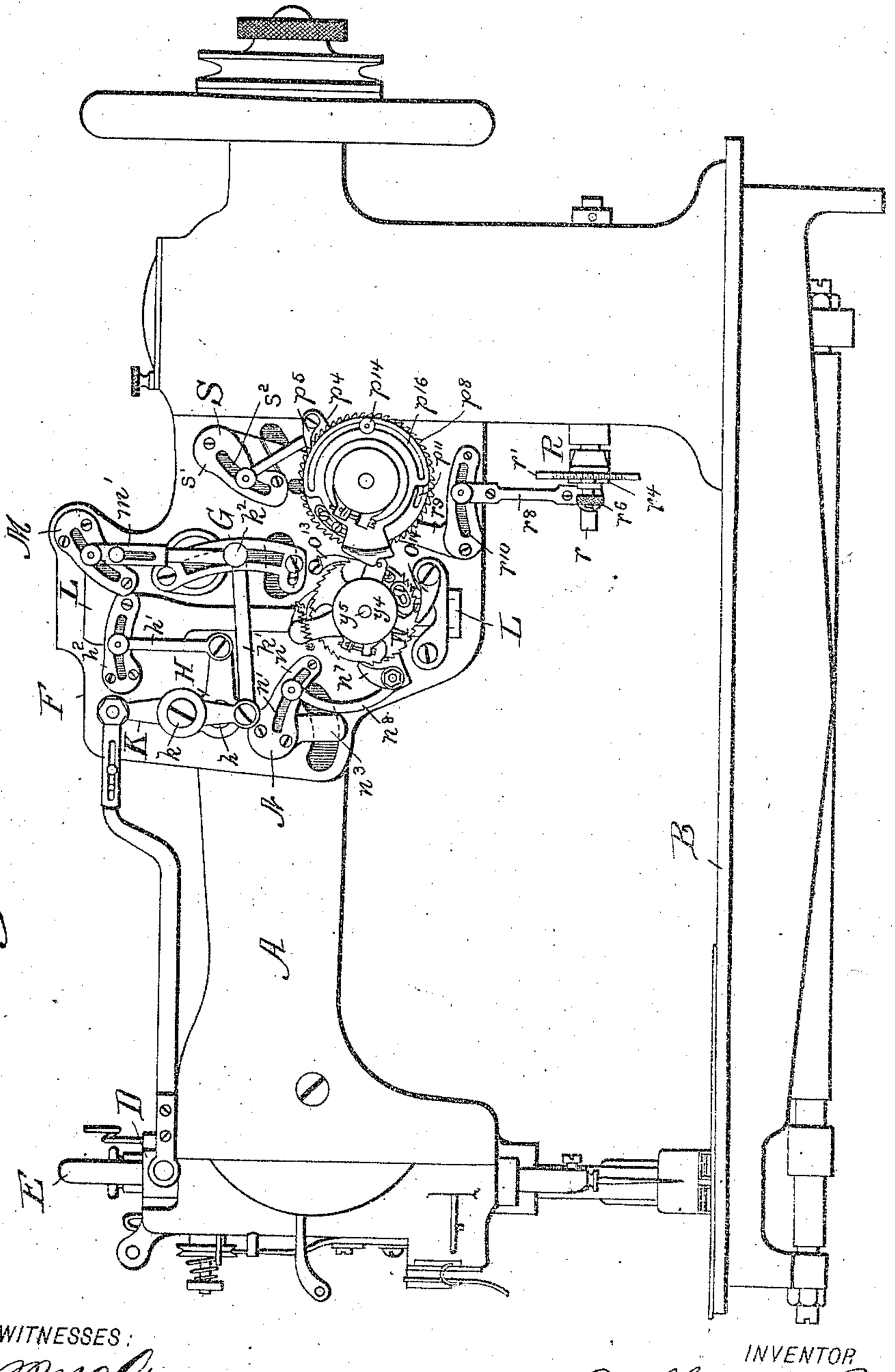


Fig. 1.

WITNESSES:
J. B. McGirr.
C. P. Hendrickson.

INVENTOR
William N. Parkes.
BY
Baker duFaul
ATTORNEY.

No. 671,680. Patented Apr. 9, 1901.

W. N. PARKES.

ORNAMENTAL STITCH SEWING MACHINE.

(Application filed Jan. 7, 1899.)

(No Model.) 5 Sheets—Sheet 2.

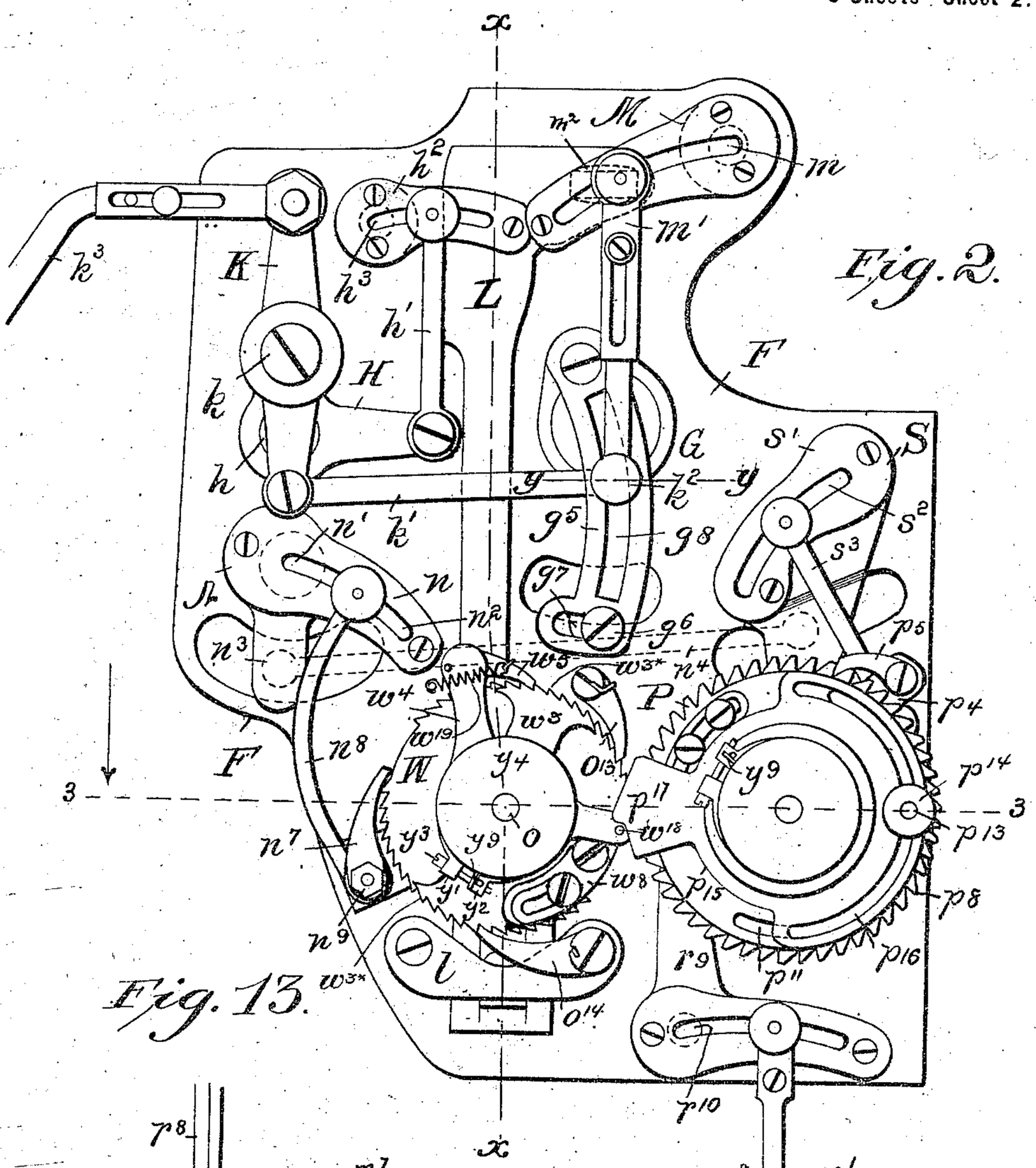


Fig. 2.

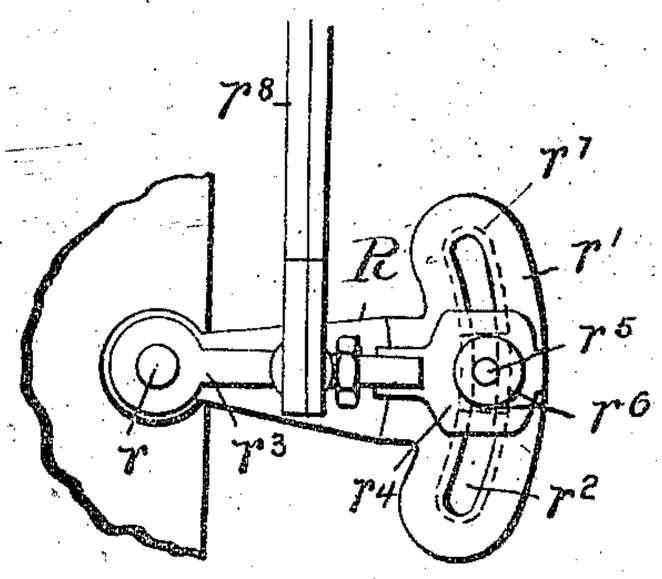
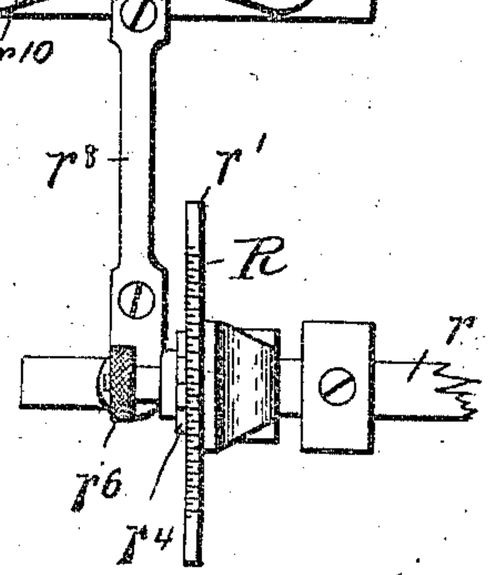


Fig. 13.



WITNESSES:

J. B. McGirr.

E. P. Hendrickson

INVENTOR

William N. Parkes,

BY

Abbott & Co.

ATTORNEY.

No. 671,680. Patented Apr. 9, 1901.

W. N. PARKES.

ORNAMENTAL STITCH SEWING MACHINE.

(Application filed Jan. 7, 1899.)

(No Model.) 5 Sheets—Sheet 3.

Fig. 3.

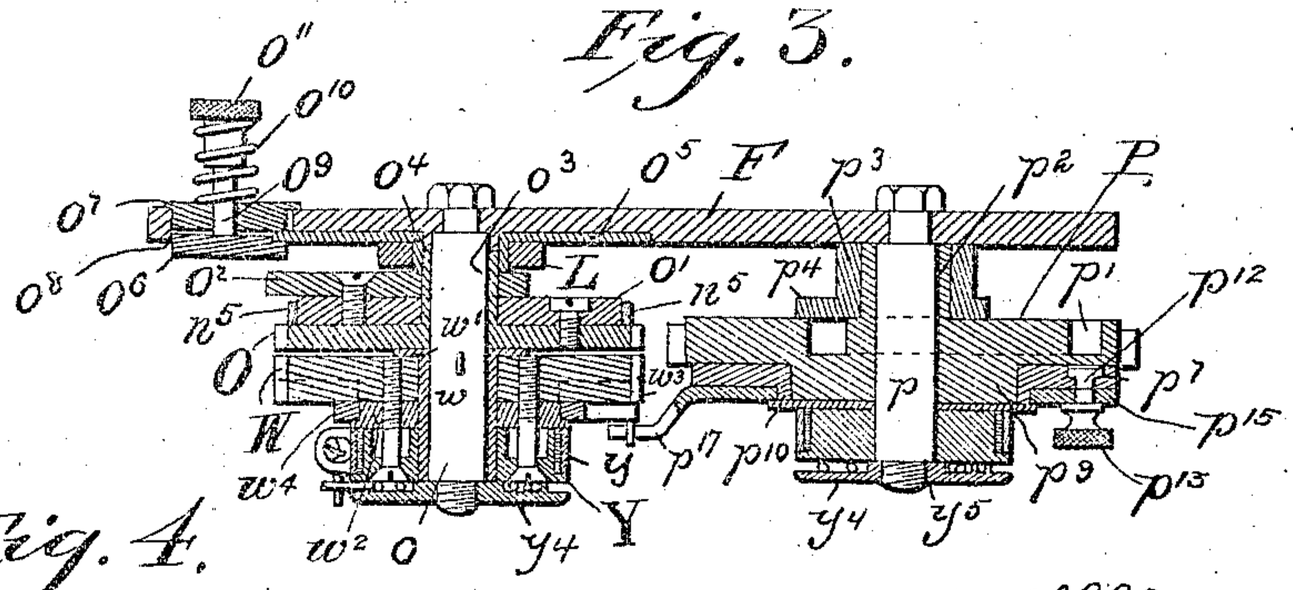
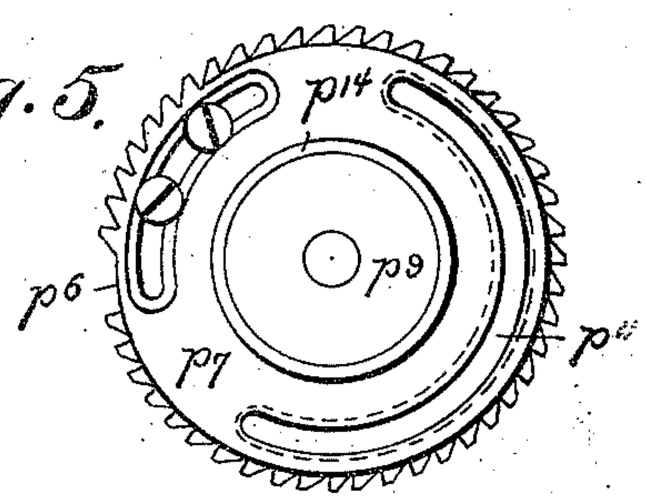


Fig. 4.

Fig. 5.



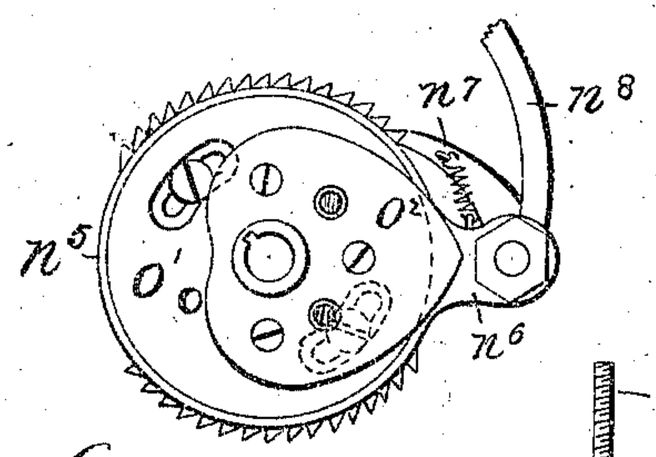
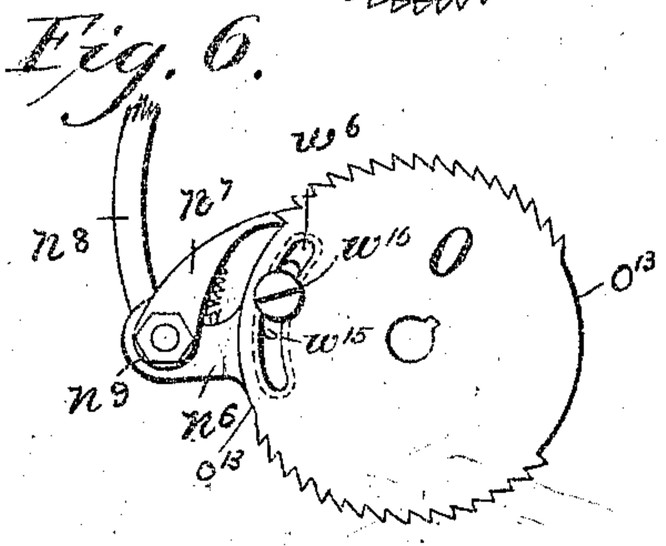


Fig. 6.



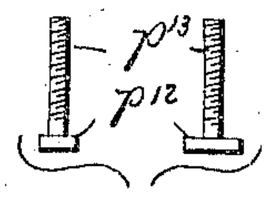


Fig. 7.

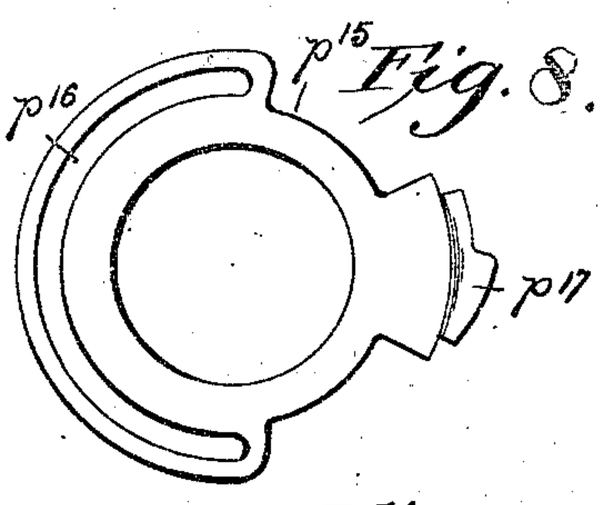


Fig. 8.

Fig. 10.

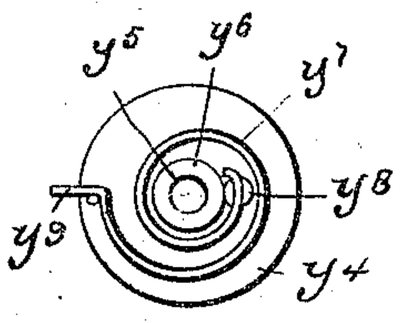
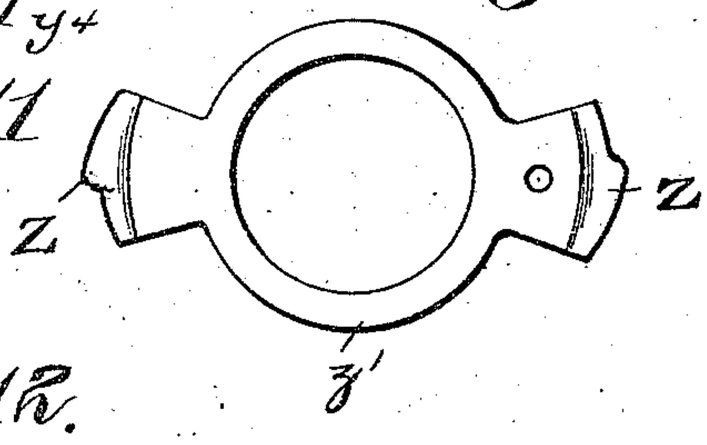


Fig. 11



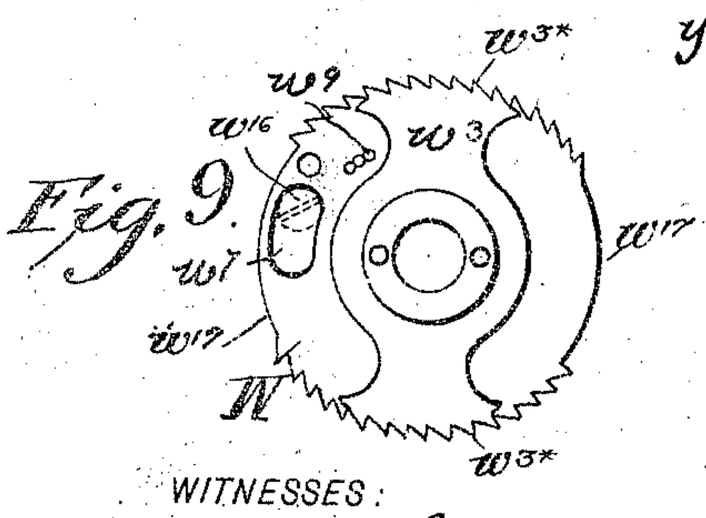
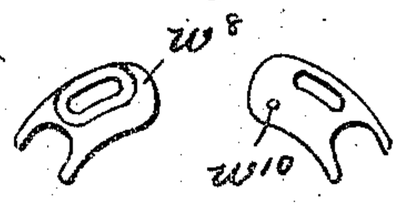


Fig. 9.

Fig. 12.



WITNESSES:

E. W. McGirr.

E. P. Hendrickson

INVENTOR

William N. Parkes,

BY

Atherton & Faust

ATTORNEY.

No. 671,680. Patented Apr. 9, 1901.

W. H. PARKES.

ORNAMENTAL STITCH SEWING MACHINE.

(Application filed Jan. 7, 1899.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 14.

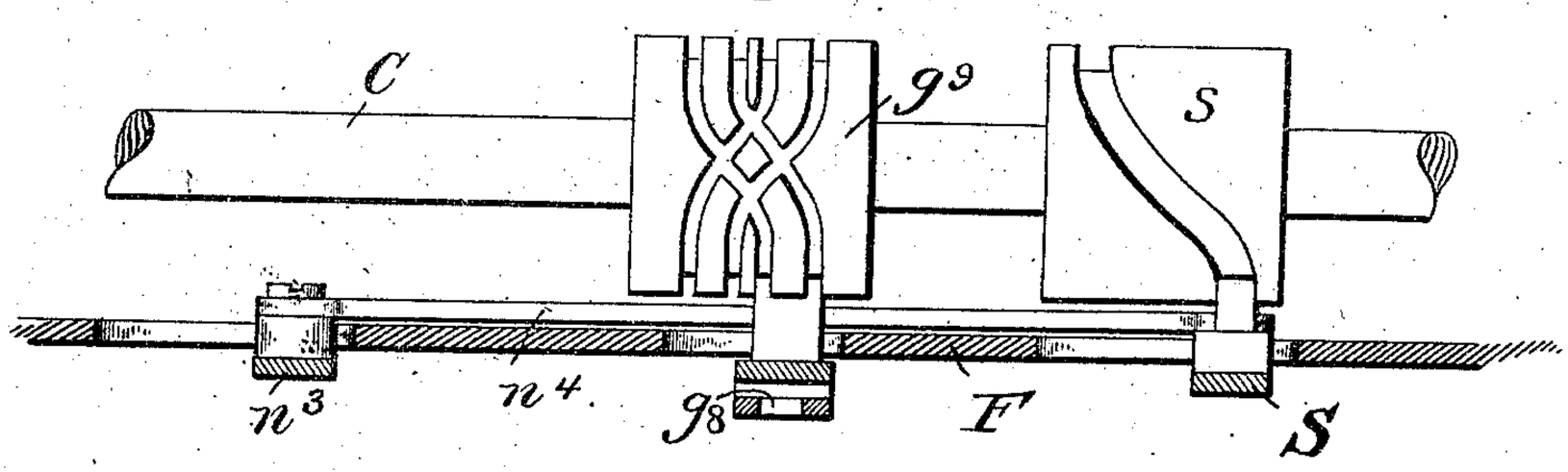


Fig. 21.

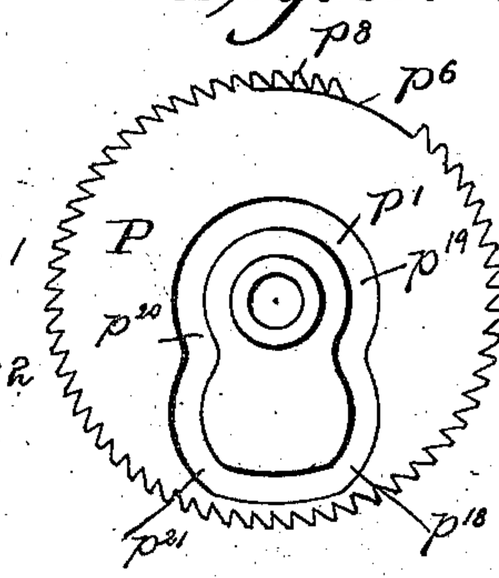


Fig. 16.

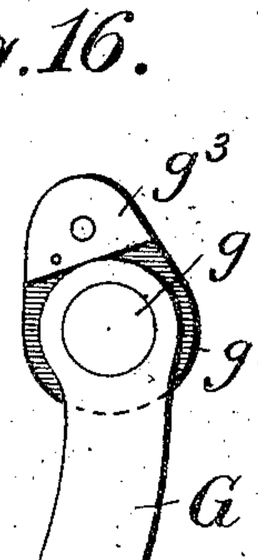


Fig. 15.

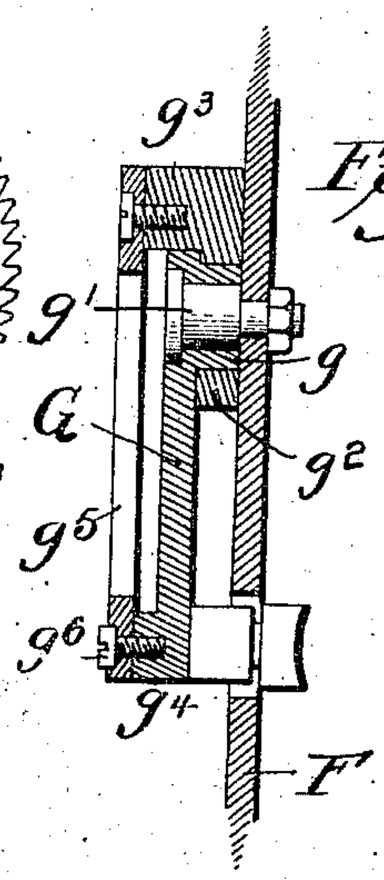


Fig. 20.

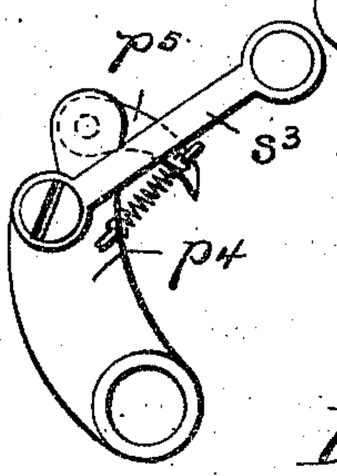


Fig. 17.

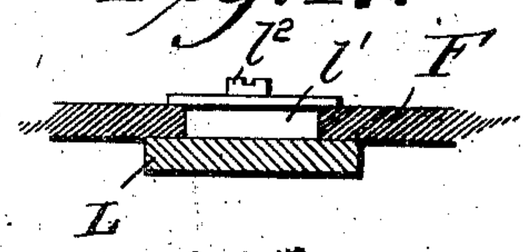


Fig. 18.

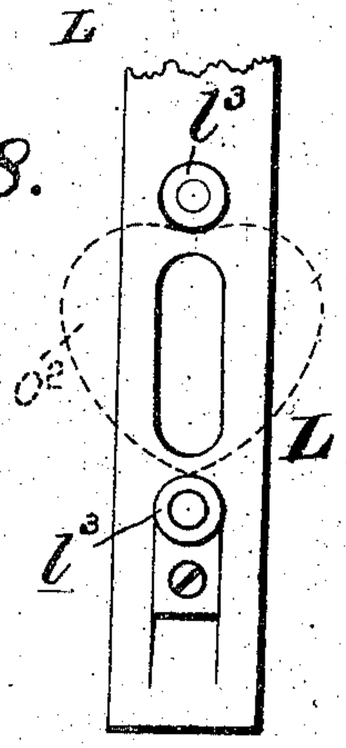
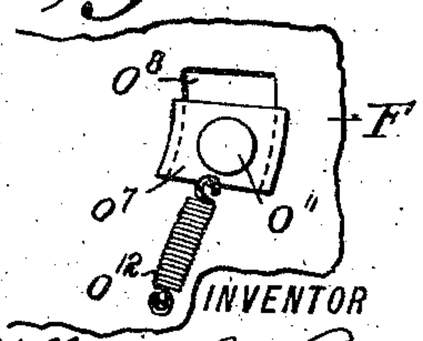


Fig. 19.



WITNESSES:

J. B. McGirr.

C. P. Hendrickson.

INVENTOR

William H. Parkes,

BY

Baker du Faur & Co.

ATTORNEY.

No. 671,680. Patented Apr. 9, 1901.

W. N. PARKES.

ORNAMENTAL STITCH SEWING MACHINE.

(Application filed Jan. 7, 1899.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 22.

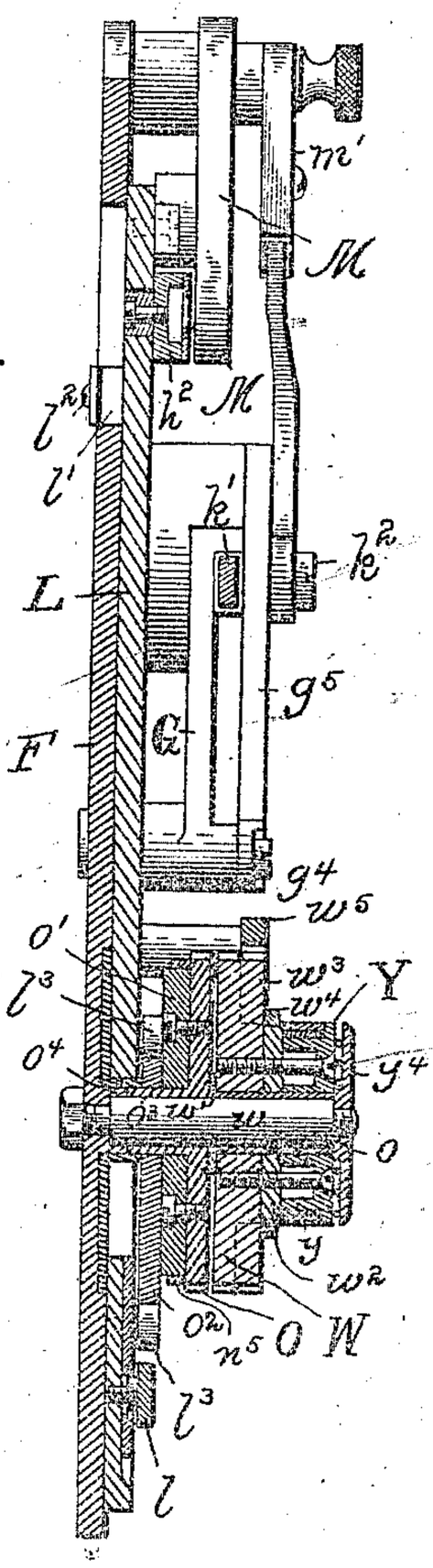


Fig. 23.

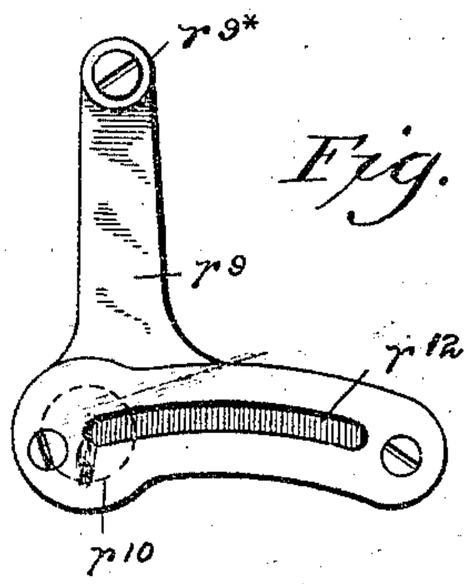


Fig. 25.

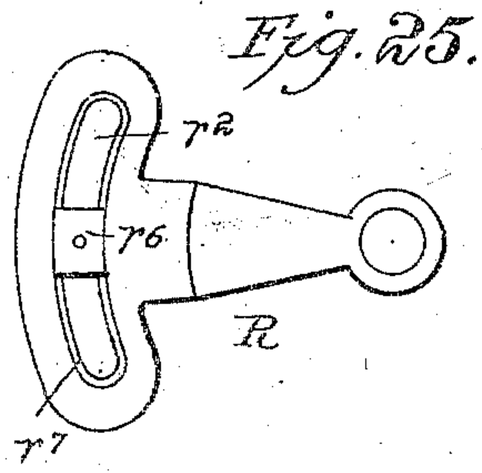
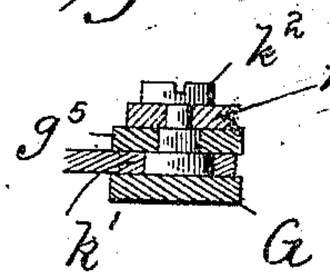


Fig. 24.



Witnesses:
J. C. McElroy.
E. P. Hendrickson

Inventor:
William N. Parkes
by Faber du Faur
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM N. PARKES, OF BROOKLYN, NEW YORK.

ORNAMENTAL-STITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,680, dated April 9, 1901.

Application filed January 7, 1899. Serial No. 701,527. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. PARKES, a citizen of the United States of America, residing at New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Ornamental-Stitch Sewing-Machines, of which the following is a specification.

United States Patent No. 592,510, granted to me October 26, 1897, shows and describes an ornamental-stitch sewing-machines, in which the needle-bar is vibrated laterally, the extent of the lateral vibrations of the same is automatically increased or decreased a predetermined amount during the formation of a predetermined number of stitches, and the working position of the lateral vibrations of the needle-bar is automatically moved laterally a predetermined extent and for a predetermined number of stitches. In combination with these movements of the needle-bar individually or collectively the extent of the movement of the feed-dog is automatically increased, decreased, or reversed for a predetermined number of stitches. In this machine these movements are under the control of a mechanism which is actuated by a ratchet-wheel, means being provided for regularly actuating the ratchet-wheel or intermittently actuating it and for adjusting the duration of the action and intermittency of the action.

June 26, 1900, United States Patent No. 652,327 was granted to me, in which I show and describe an ornamental-stitch sewing-machine in which the lateral movements of the needle-bar are under the control of a cam actuated by a ratchet-wheel and the extent and duration of the movements of the feed-dog of the machine are under the control of a second cam actuated by a second ratchet-wheel, the movements of these feed-wheels being under separate adjustment and entirely independent of each other in their action. As has been somewhat fully described in the above-referred-to former patents, the changes in the speed of rotation of these ratchet-wheels with respect to each other or changes in their actuating positions relative to each other of the cams actuated by them produce an endless variety of ornamental stitches.

The main object of my present invention is to provide means adapted to prevent any undesirable change in the relative positions of these ratchet-wheels and through them to prevent any undesirable change in the actuating position relative to each other of the cams actuated by them. In other words, it is a separate independently-adjustable mechanism for controlling the lateral movements of the needle-bar and a separate independently-adjustable mechanism for controlling the movements of the feed, which when set to be used in combination with each other to produce any particular stitch will continue to produce the same stitch, and if turned out of their relative position with each other, which produces this particular stitch, will when the machine is started at once assume their proper relations again.

Other objects of this invention will appear in the detailed description which I will now make.

Referring to the drawings, Figure 1 represents a front elevation of a machine with my invention attached thereto. Fig. 2 is a separate view, on an enlarged scale, of the mechanism. Fig. 3 is a section on the line 3 3, Fig. 2. Fig. 4 is a rear view of the needle-bar-controlling ratchet-wheel, showing the pawl-lever disk attached thereto and the actuating-cam attached to the disk. Fig. 5 is a front view of the feed-controlling ratchet-wheel with the gap-adjusting disk attached thereto. Fig. 6 is a front view of the needle-bar-controlling ratchet-wheel. Fig. 7 is a detail showing the bolt for connecting the parts p^{15} and p^{7}. Fig. 8 is a front view of the regulating-segment. Fig. 9 is a front view of the auxiliary needle-bar ratchet-wheel. Fig. 10 is a plan view of a modification of Fig. 8. Fig. 11 is one of the ratchet-wheel-retaining nuts, showing the friction-strap-controlling spring attached thereto. Fig. 12 is a top and bottom view of the needle-bar auxiliary ratchet-wheel-adjusting segment. Fig. 13 is a side view looking from left to right, showing the feed connections and adjustments shown in Fig. 2. Fig. 14 is a detail of the upper shaft of the machine, showing the actuating-cams thereon and the connections from the cams to the mechanism. Fig. 15 is a sectional view of the segment-lever G and its auxiliary segment-plate attached thereto. Fig. 16 is a detail plan view of the lever G

with its auxiliary segment-plate removed. Fig. 17 is a detail sectional view showing the manner of guiding the upper end of the slide L. Fig. 18 is a detail view showing the manner of engagement between the slide L and its actuating-cam. Fig. 19 is a rear view of the friction device for the disk o^5. Fig. 20 is a bottom view of the feed-controlling ratchet pawl-lever and pawl. Fig. 21 is a bottom plan view of the feed ratchet-wheel and cam formed therein. Fig. 22 is a vertical section on the line $x\ x$, Fig. 2. Fig. 23 is a face view of the bell-crank lever r^9. Fig. 24 is a horizontal section on the line $y\ y$, Fig. 2. Fig. 25 is a side view looking from right to left of the end of the lever R, showing the guideway therein for the nut r^6.

Similar letters of reference designate corresponding parts throughout the several views of the drawings.

A represents the arm of the machine; B, the bed; C, the upper shaft; D, the needle-bar gate, and E the needle-bar mounted thereon.

On the side of the arm A of the machine I attach in a vertical position a plate F, on which my mechanism is mounted. A segment-lever G, having a sleeve g, is fulcrumed at one end on a stud g', which is rigidly attached to the plate F. The lever at its other end is in engagement with a switch-cam through a usual switch-cam follower, as shown in Fig. 14. On the sleeve g is journaled a collar g^2, having an extension or boss g^3. On the lower end of the segment-lever G is a boss g^4. On the face of the boss g^3 is rigidly attached an auxiliary segment-plate g^5, the lower end of which is attached to the face of the boss g^4 by means of a screw g^6, passing through a slot g^7, formed in the lower end of the auxiliary segment-plate g^5. Longitudinally of the auxiliary segment-plate g^5 is formed a slot g^8, the upper end of which is directly over the pivot of the segment-lever G. By this construction it is seen that the lower end of the auxiliary segment-plate g^5 can be readily adjusted laterally and that its upper end will turn on the same axis as the lever G. It is also seen that the auxiliary plate g^5 and the collar g^2, rigidly connected thereto, form a second segment-lever, fulcrumed on the sleeve g of the first segment-lever.

A lever K is fulcrumed at k on a bell-crank lever H, which is suitably fulcrumed at h to the plate F. To the lower end of the lever K is attached one end of a link k', the other end of which encircles a boss formed on the under side of a shoe k^2, the shoe being adapted to slide in the slot g^8 and the boss to slide on the face of the lever G, this contact serving to retain the shoe in the slot and to prevent any rocking of the same. To the upper end of the lever K is attached one end of a link k^3, which at its other end is attached to the needle-bar gate D.

L is a slide guided at its lower end on the plate F by means of the bridge l and at its upper end by means of a slide-block l', to which it is attached by means of the screw l^2, the slide-block being guided by means of a slot in the plate F. On the slide L are friction-rollers l^3, the lower one of which is adjustable, as shown in Fig. 18.

M is a segment-lever fulcrumed at m on the plate F, the free end of which is connected with the slide L by means of an ordinary shoe-and-slot connection. A link m' is at its upper end adjustably connected in a suitable manner to the lever M and at its lower end to the link k', as shown in Figs. 2 and 24.

To the end of the horizontal member of the bell-crank lever H is attached the lower end of a link h', the upper end of which is adjustably attached to a segment-lever h^2, which is fulcrumed on plate F at h^8 and the outer end of which is connected by means of an ordinary shoe-and-slot connection to the slide L.

N is a bell-crank lever having a member n, on the face of which is attached a plate n', in which is formed a curved guideway n^2. To the other member n^3 of the bell-crank lever N is attached one end of a link n^4, which is connected at its other end to a lever S, and which in turn is in operative connection with a grooved cam s, mounted on the upper shaft C of the machine through a stud and friction-roller connection, as shown in Fig. 14. A strap n^5, encircling a disk o', terminates at its outer end into a pawl-lever n^6, on which is mounted a pawl n^7, a link n^8 being attached at n^9 to the pawl-lever n^6 and at its other end adjustably to the member n of the lever N. On the face of the lever S is attached a supplemental plate s', in which is formed a curved guideway s^2.

O is the needle-bar-controlling ratchet-wheel, mounted on a stud-shaft o, which is suitably attached to the plate F. In the teeth of the ratchet O are formed gaps o^{13}. On the under side of the ratchet O is adjustably attached the disk o', on the under side of which in turn is adjustably attached a cam o^2. A sleeve o^3, formed on the under side of the ratchet O, passes through the disk o' and the cam o^2 into an upwardly-extending sleeve o^4, formed on a disk o^5, the sleeve o^4 being suitably keyed to the sleeve o^3. The disk o^5 is let into the plate F, so as to permit of the free passage of the slide L, which rides on the plate F, a slot being formed in the slide of suitable width to allow the free passage of the same on the outside of the sleeve o^4 and of suitable length to allow of the reciprocations of the slide.

Slide-blocks o^6 and o^7 are suitably formed to slide in a guideway or slot o^8 formed in the plate F and to clamp the edge of the disk o^5, stud o^9, spring o^{10}, and nut o^{11} serving as a means to increase or decrease the pressure of the block on the disk o^5. A spring o^{12} is at one end attached to the block o^7 and at its other end to a fixed pin affixed to the plate F, as shown in Fig. 19, which spring, through

the blocks, normally draws on the disk o^5 in the opposite direction to the rotation of the ratchet O. The contact portion of the slide-blocks o^6 and o^7 with the disk o^5 can be made of any suitable friction material.

A stud-shaft p is rigidly attached to the plate F, on which is mounted to turn a ratchet cam-wheel P, in which is formed a groove-cam p'. In the teeth of the ratchet cam-wheel P is formed a gap p^6. A sleeve p^2 is formed on the ratchet cam-wheel and extends from the same to the plate F. On a pawl-lever p^4 is formed a sleeve p^3, which is mounted on the sleeve p^2 of the ratchet. On the free end of the pawl-lever p^4 is mounted a pawl p^5, which is adapted to engage the ratchet cam-wheel P. A link s^3 is at one end attached to the pawl-lever p^4 and at its other end adjustably in the guideway s^2, formed in the supplemental plate s', which is attached to the lever S, the guideway s^2 being formed so that the adjustment of the end of the link s^3 in the same will not change the point at which the pawl p^5 will finish its forward stroke. On the outer side of the ratchet cam-wheel P is formed a hub p^9, on which is mounted a disk p^7, a sufficient number of teeth being formed on the periphery of the disk to close gap p^6, formed in the teeth of the ratchet cam-wheel P, the ordinary slot-and-screw connection (shown in Fig. 5) serving as a means for circularly adjusting the disk to close or open the gap p^6.

R is a feed-regulating lever attached at one end to the feed-regulating shaft r of the machine, the outer end r' of which is formed into a segment in which there is a slot r^2. Alongside of the feed-regulating lever R on the feed-regulating shaft r is loosely mounted one end of a feed-indicating lever r^3, on the outer end of which is attached an indicator q^4. Through the indicator r^4 and the slot r^2 passes a thumb-screw r^5, which has a seat in a nut r^6 and is held from turning by being let into a way r^7, in which it is adapted to slide. A link r^8 is operatively connected at its lower end through a ball-joint connection to the feed-indicating lever r^3 and at its upper end through a ball-joint connection in a guide-way r^{12}, formed in the horizontal member of a bell-crank lever r^9, which is fulcrumed at r^{10} to the plate F and the vertical member of which is in engagement with the groove-cam p', through a usual friction-roller r^{9*}, which is suitably mounted on the end of the same.

On the stud-shaft o is keyed a sleeve w, having a flange w'. A ratchet W, in which are formed gaps w^{17}, is mounted on the sleeve, the flange w' serving to separate the ratchet W from the ratchet O. On the ratchet W is formed a ratchet-segment w^3, which has toothed portions w^{3*}. A disk w^2 acts as a hub for a bell-crank lever w^1, on the vertical end w^{19} of which is attached a pawl w^5, which is adapted to engage the teeth of the segment w^3. In a guideway w^6 is a shoe w^{15}, in which a screw w^{16}, passing through a slot in the wheel O, has a seat. The head of the screw extends outwardly into a slot w^7, formed in the wheel W. The extent of the slot w^7 in the present machine is made of sufficient length to allow the wheel W to turn the distance of two of its teeth. A segment w^8 serves as an adjustment to close the slot w^7, so that the wheel W can only move one tooth, or to close it, so there will be no movement at all of the wheel W relative to the wheel O. The holes w^9 in the wheel W, in which the pin w^{10} on the segment w^8 fits, serve as a means for locating the segment the exact amount of one or more teeth in adjusting it.

In the disk p^7 is formed a slot and guide-way p^{11}, in which a shoe p^{12}, formed on the end of a threaded bolt p^{13}, is adapted to slide. On a hub p^{14}, formed on the disk p^7, is placed a regulating-segment p^{15}, in which a slot p^{16} is formed and on which a cam p^{17} is constructed. The threaded bolt p^{13} passes through the slot p^{11} in the disk p^7 and the slot p^{16} in the segment p^{15}. An ordinary thumb-nut on the threaded portion of the bolt p^{13} serves, in connection with the shoe p^{12}, as a means for clamping the said segment p^{15} to the disk p^7. The slots p^{11} in disk p^7 and p^{16} in disk p^{15} are of sufficient length to allow of the complete adjustment of the cam p^{17} around the ratchet cam-wheel P. In the horizontal member of the bell-crank lever W^4 is a pin w^{18}, which is adapted to be engaged by the cam p^{17}. The cam p^{17} is constructed to turn the wheel W the distance of one tooth through one engagement with the pin w^{18}.

A cylinder Y is attached to the ratchet W, the periphery of which is adapted to carry a friction-strap y, which has extensions y' and y^2. A screw y^3, passing freely through extension y' and having a seat in extension y^2, serves as a means for regulating the amount of friction produced by the friction-strap. The outer end of the stud-shaft o is reduced and threaded, on which a nut y^1 is adapted to fit by means of the threaded hole y^5, passing through a hub y^6, formed on the nut. A friction-strap controlling spiral spring y^7 is adapted to be held by the nut y^1 by means of the slotted stud y^8, a stop-pin y^9 serving to keep a tension on the spring. The hub y^6 on the nut is of sufficient height to allow of the free play of the spring and of sufficient diameter to retain the mechanism on the stud-shaft o. The extending end of the spring y^7 when the nut is in place comes into contact with a pin (not shown) extending from the under side of the extension y^2 of the friction-strap and yieldingly retains the same against the forward movement of the ratchet-wheel W.

A friction device substantially the same as the one just described in connection with the ratchet-wheel W is used for controlling the cam-ratchet P.

The friction devices used in connection

with my present invention are not herein claimed. United States Patent No. 585,225, granted to me June 29, 1897, broadly covers the principle involved in these friction devices.

In Fig. 10 I show a modified double-cam arrangement Z, formed on a disk z', which is adapted to take the place of the segment p^{15} when shorter stops are wanted in the needle-bar-actuating ratchet than those produced by the regulating-segment shown in Fig. 8.

I will now explain the functions of the various parts and their operation so far as it is thought necessary for a complete understanding of the invention.

Assuming, to begin with, that the ends of the links m', h', n^8, s^3, and r^8 are adjusted centrally over the fulcrums of the segment-levers, with which they are connected, straightway stitching only will be produced. If now the link m' is adjusted out on the segment-lever M, (the outer end of the said lever being below its highest position, as shown in Fig. 2,) the needle-bar will get an ordinary lateral vibration which will produce the ordinary zigzag or overseam stitch. The guideway formed in the segment-lever M is curved from the center of the fulcrum of the segment-lever G, when the said lever M is in its highest or horizontal position. Consequently adjusting the link m' out on the lever increases the downward stroke of the link m', and through it the shoe k^2 and the end of the link k', which is attached thereto. Now adjust the ratchet-wheels O and W so there will be one complete circle of teeth for the pawl n^7 to engage and adjust the end of the link out on the segment-lever N. The result will be, of course, through the action of the pawl n^7, a continuous rotation of the ratchet-wheel and through it uniform reciprocations of the slide L, which in turn will actuate the lever M on its fulcrum, and the movements of this lever will in turn, through its connections, increase and decrease the extent of the lateral vibrations of the needle-bar.

If the plate g^5 is in the position shown in Fig. 2, this increase and decrease will be equal on each side of a center line; but, however, if the lower end of the plate g^5 is adjusted to the right the extent of the transverse slot g^7 the increase and decrease will be all on one side of a center line. The curved slot or guideway g^8 in the auxiliary plate g^5 is made from the center of the connection between the link k' and the lower end of the lever K when the said lever and the levers G and H are in the center position of their lateral movement and the auxiliary plate g^5 is in the position shown in Fig. 2. The transverse slot g^7 in the lower end of the auxiliary plate g^5 is of sufficient length to permit the plate to be moved laterally the extent of one-half of the lateral movement it receives from the cam g^9, so when the plate is adjusted to this lateral position the increase and decrease in the lateral vibrations of the needle, as above stated, will be on one side of a center line.

The curved guideway n^2 in the plate n' of the lever N is curved from the center of the connection n^9 between the link n^8 and the pawl-lever n^6 when the member n of the lever N is in its highest or horizontal position to which it is moved when actuated. This formation of the guideway n^2 insures the ending of the forward stroke of the pawl n^7 at one point under any adjustment of the end of the link n^8 on the segment-lever L. The teeth in the ratchet W are sufficient to close the gaps o^{13} in the ratchet O, and the gaps w^{17} in the ratchet W are of the same extent as the gaps o^{13} in the ratchet O, and the guideway w^6 in the ratchet O is of sufficient extent to admit of the adjustment of the ratchet W so as to cover the gaps o^{13} in the ratchet O with the teeth of the ratchet W. To close the gaps o^{13} in the ratchet O, the screw w^{16} is loosened, (which in turn loosens the clamping-shoe w^{15}, which is formed to slide in the guideway w^6.) Then the ratchet-wheel W is turned to the right until the teeth of the ratchet-wheel W close the gaps o^{13}, when the shoe w^{15} is again clamped by means of tightening the screw w^{16}. One of the purposes for which the means for forming gaps in the periphery of the feed-wheels is provided is to keep the relative position of the finishing of the stroke of the actuating-pawl the same with respect to the position of the mechanism actuated through its movements. The adjustment of the disk o' circularly on the ratchet O, as shown in Fig. 4, is for the purpose of adjusting the position of the cam o^2 relative to the gaps o^{13} in the ratchet O, the said cam, as has been seen, being fastened to the disk. To more fully explain the use of the gaps in the periphery of the feed-wheel for the purpose named, we will assume that the pawl n^7 is being actuated so as to move the ratchet which it actuates forward four teeth at each stroke and that there are no gaps in the feed-wheel or that the gaps o^{13} are closed. It is of course understood that the slide L under these conditions will be reciprocated through the action of the cam o^2 and that some individual stroke of the actuating-pawl n^7 will finish the movement of the slide L in one direction and some other individual stroke of the said pawl will finish its movement in the other direction. Now the difficulty under these circumstances is when the finishing movement of the slide is reached half of the stroke of the pawl may finish the movement of the slide, and the other half may commence the return movement of the same. When the extent of the lateral vibration of the needle is being automatically increased and decreased, the maximum vibration is reached when the slide L is in its extreme position in one direction and the minimum when it is in its extreme position in the other direction. The needle reciprocates each time the pawl actuates and also moves laterally. Therefore it

can be seen that if the extreme movement of the slide L is made in the middle of a stroke of the actuating-pawl n^7 the needle-bar is not in the extreme position laterally it would be in if the slide L reached its extreme position at the finishing of a stroke of the actuating-pawl. As the stroke of the actuating-pawl is increased the defect caused by its not finishing a movement of the cam it actuates in unison with the finishing of its stroke is increased. Of course ordinary ratchet-wheels can be set so the finishing stroke of their actuating-pawls will be in unison with a particular movement or position of the cam which they actuate; but if the pawl is being actuated so as to feed the wheel more than one tooth at a stroke any change of the wheel relative to its actuating-pawl less or more than the number of teeth through which the pawl is engaging the wheel will change the unison between the finishing of the stroke of the pawl and a particular movement of the cam it actuates. For example, we will assume that the stroke of the actuating-pawl is the extent of six teeth of the ratchet-wheel and that the finishing action of the cam it actuates is in unison with the finishing of a stroke of the actuating-pawl. Now it is evident that if we turn the ratchet, say, for example, three teeth of the wheel relative to the actuating-pawl the finishing of the stroke of the pawl will not be in unison with the finishing action of the cam it actuates. If the wheels are set right to start with, just as soon as they are changed, inadvertently or otherwise, defective patterns of stitches are produced. If the wheel is being fed six teeth at a stroke of the actuating-pawl and the operator moves the hand-wheel in removing the work less than enough to make a complete movement of the actuating-pawl, the movement of the stroke of the actuating-pawl will be thrown out of time with the movement of the cam and the mechanism actuated by the cam. Any movement of the machine other than that which will produce complete movements of the actuating-pawl (provided it is enough to move the ratchet one tooth) will throw the stroke of the pawl out of time with the mechanism which it actuates. My mechanism overcomes this defect, as will be seen by the following: When it is desired to only use the gaps o^{13} for the purpose of keeping the finishing of the stroke of the actuating-pawl in unison with the finishing of a particular part of the actuating movement of the cam actuated by it, the slot w^7 is closed by means of adjusting the segment w^8, so as to prevent any movement of the screw w^{16} in the slot w^7. In this position the screw w^{16} serves as an adjusting connection between the ratchets O and W for determining the extent of the gaps o^{13}. Now if it is desired, for example, to feed the ratchet four teeth at each stroke of the actuating-pawl the gaps o^{13} are opened the extent of three teeth, so that when the pawl reaches the gaps it will just jump over them and engage the first tooth on the other side. The gaps are opened by loosening the screw w^{16} and turning the ratchet W to the left the desired extent, when the screw is of course again tightened. The pawl n^7 always finishing its stroke at one point under different adjustments of the extent of its action serves, it is seen, in combination with the gaps and their being opened in a direction opposite to the forward movement of the pawl, in always keeping the action of the individual strokes of the pawl in unison with the movement, or a predetermined part of the movement, of the mechanism actuated by it. It is of course understood that one gap is all that is necessary for this purpose.

The gap p^6 in the teeth of the ratchet P and the means for adjustably closing the same are for the same purpose as the gaps in the ratchet W, so far as the working of the mechanism has been explained. The curved guideway s^2 in the lever S is formed from the center of the connection between the link s^3 and the pawl-lever p^4 when the lever S is in the extreme forward position of its movement. Consequently the forward movement of the pawl, as before stated, always stops at a given point, the adjustment of the extent of the stroke of the same affecting it in one direction only—namely, its backward movement from the fixed point where it always terminates its forward movement. The ratchet-wheel P preferably has forty-eight teeth in its periphery when the gap p^6 is closed, and the gap is the extent of six teeth of the wheel. The circumferential extent of the different proportions of the cam p' is preferably as follows: from p^{18} to p^{19} the extent of six teeth of the ratchet; from p^{19} to p^{20}, thirty teeth; from p^{20} to p^{21}, six teeth, and from p^{21} to p^{18}, six teeth. The action of the said cam p' on the feed-regulating lever R through the intermediate mechanism is preferably as follows: From p^{20} to p^{21} the said lever is moved in the direction in which it is moved to shorten or reverse the stitch. From p^{21} to p^{18} it does not actuate the feed-regulating lever at all. From p^{18} to p^{19} it moves it in the direction in which it is moved to lengthen the stitch or to actuate the feed to move the work in a direction from the operator, and from p^{19} to p^{20} it does not move the feed-regulating lever.

The graduated scale on the edge of the part r^6 of the feed-regulating lever R (shown in Fig. 2) serves as a means, in combination with the indicator r^1, for predetermining the direction of the movement of the feed. For example, when the indicator is secured in the central position (shown in Fig. 13) the action of the cam p' through its intermediate mechanism on the feed-regulating lever R is such that the length of the stitch is the same in either direction—that is, when the stitching is being done backward and forward. The curved guideway r^{12}, formed in the lever r^9, is curved from the center of the connection between the link r^8 and the feed-indicating

lever r^3 when the lever r^9 is in a central position with respect to its movements. Thus it is seen that adjusting the end of the link r^8 out on the horizontal member of the bell-crank lever r^9 increases the extent of the movement of the feed-indicating lever equally on each side of a given line, and that consequently when the indicator r^4 is secured in a central position the extent of the movements of the feed under the action of the cam p' will be the same backward and forward. When it is desired to lengthen the stitch backward and forward, the end of the link r^8 is of course adjusted to the right in the guideway r^{12}, and vice versa when it is desired to shorten the stitch. When it is desired to lengthen the stitch more in one direction than the other or to have its movements all in one direction, the indicator r^4 is adjusted to one side of its central position. The particular side to which it is adjusted will of course determine the direction in which the change will be made, as is well understood.

The actuating-cams for the mechanism are timed as follows: The cam g^9 so as to move the needle-bar laterally when it is in or near its highest position, at which time, of course, the needle is disengaged from the goods, and the cam s is timed so as to actuate the pawl n^7 forward at about the same time. When the pawl n^7 moves forward, the pawl p^5 moves backward, and when the pawl n^7 moves backward the pawl p^5 moves forward, as is seen by the connections between the pawls and the lever S. Thus it is understood that the ratchet-wheel P is actuated after the feed-dog has completed its movement of the work and become disengaged from the same, it being understood, of course, that the time of the movement of the feed-dog relative to the movement of the needle-bar is substantially the same as in ordinary zigzag or over seaming machines, in which the needle-bar is moved laterally. The cam p' is so placed in the ratchet-wheel P relative to the gap p^6 that the friction-roller r^{9*} on the vertical member of the lever r^9 is always at p^{19} at the finishing of a stroke of the actuating-pawl p^5 when the stroke of the pawl is the extent of one, two, three, or six teeth of the wheel. Thus it is seen that if the stroke of the pawl is the extent of six teeth of the ratchet the feed of the work will be reversed between the completion of one stitch and the beginning of another, provided the indicator r^4 is in a central position or under any adjustment of the indicator the change in the movement of the feed will take place during this time.

The ratchet-wheel O is preferably provided with forty-eight teeth—that is, when the gaps o^{13} are closed by the ratchet W there are that many teeth through which the pawl n^7 actuates in rotating the wheel once. All the lateral movements of the needle-bar being transmitted through the lever K and its connections to the needle-bar and the said lever being fulcrumed on the vertical member of the bell-crank lever H, it is of course seen that when the said lever H is actuated the working or lateral vibrating position of the needle-bar is changed laterally. The curved guideway in the segment-lever h^2, in which one end of the link h' is adjustably connected, is preferably curved from the center of the connection between the said link h' and the horizontal member of the bell-crank lever H when the said lever H is in a position central of its actuating movements. Thus it is seen that the change in the working position of the needle is equal on each side of a center line.

It is now seen that I have explained the functions of a ratchet-wheel-actuated mechanism for automatically making an unlimited number of lateral movements of the needle and changes in the extent of the said lateral movements for automatically changing the working position of these lateral movements and for adjusting the extent of the change in the lateral movements of the working position of the needle. I have also explained the functions of a ratchet-wheel-actuated mechanism adapted to automatically change the direction of the movements of the feed and to adjust and predetermine the extent of the movement on either side of a center line. It is also seen that so far as explained we have means for automatically keeping the movements of the strokes of the pawls in unison with the movements of the cams actuated through the action of the pawls. It can be seen, of course, that when these two ratchet-actuated mechanisms are used in combination their actuating position relative to each other determines very largely the nature or pattern of the stitch. For example, suppose the action of the pawl n^7 is the extent of three teeth of the ratchet O and the pawl p^5 six teeth of the ratchet P and the mechanism so adjusted that there is only a lateral movement of the needle through the action of the slide L on the segment-lever h^2 and through it on the needle-bar. Under these conditions the ratchet P will make two complete revolutions to one of the ratchet O. Now suppose the ratchet P is circularly adjusted or timed relative to the ratchet O so that when the slide L is in one of its extreme positions to one side of the center of its action the feed is reversed. It can be readily seen that if the extent of the feed is the same backward and forward the stitching on reversal will be over the same path which was stitched in the forward movement the number of stitches made on reversal, which in this case, the stroke of the pawls being as above stated, would be two. Now if the ratchet O is turned one-fourth around the reversal of the feed will be when the needle is in the middle of its lateral movement, and consequently it can be seen the reversal will not be over the same path at all, and therefore a different pattern altogether will be stitched, it being understood, of course, that indicator r^4 is secured

in a central position. Thus it is seen that changing the position circularly of one of the ratchets only changes the pattern stitched. Every change made in the actuating positions relative to each other of the primary cams actuated by these separately-actuated ratchet-wheels changes the pattern stitched, as does any change in the extent of the stroke of the actuating-pawls.

The difficulty or defect in this combination of two separate adjustable ratchet-actuated mechanisms is when it is desired to use them in combination. As above explained, the inadvertent turning of one of the ratchets changes the nature of the stitch.

I will now explain the working of the mechanism I provide which keeps the ratchets the same relative to each other when the mechanism is set for any particular stitch, or if they are inadvertently turned out of their proper relation with each other at once brings them into their proper position again. The face of the actuating-pawl n^7 is of sufficient width to engage the teeth of both the ratchet-wheels O and W. To prevent the action of the ratchets and through them the cams actuated by the ratchets from changing with respect to each other, adjust the segment w^8 so the ratchet W can be moved the extent of one tooth of the ratchet O. Adjust the screw w^{16} so the extent of the gaps o^{13} is the extent of the action of the pawl n^7 when the connection w^{16} is at the forward end of the slot w^7. The gaps o^{13} and guideway w^6 in the ratchet O and the gaps w^{17} in the ratchet W are located so that under any adjustment of the ratchet W to close or open the gaps o^{13} the pawl n^7 actuates the ratchet O through engagement with the teeth on the said ratchet at least one movement of the actuating-pawl before a gap reaches the same, and thereby the ratchet O is moved forward relative to the ratchet W, the object of which will appear in the following explanation of the workings of the device.

The operation of the device for keeping the movements of one of the ratchet-actuated mechanisms in a predetermined position relative to the other ratchet-actuated mechanism is as follows: Assuming that the connection w^{16} is at the rear end of the slot w^7, as the ratchets O and W turn under the action of the pawl n^7 one of the gaps w^{17} in the ratchet W reaches the pawl, exposing the teeth of the ratchet O only to the action of the said pawl, and as the connection w^{16} between the wheels is in the end of the slot w^7 feeds the wheel O ahead one tooth, which brings the connection w^{16} to the forward end of the slot w^7, after which the two wheels move forward together. This opens the gaps o^{13} the full extent of the stroke of the pawl n^7, and of course without help from some other source the ratchet-wheels O and W will not move forward. The face of the pawl w^5 on the vertical member of the bell-crank lever w^4 is only of sufficient width to engage the teeth w^{3*} and w^{4*} of the ratchet-segment w^3. The cam p^{17} on the segment p^{15} is constructed so that when it comes into contact with the projecting pin w^{18} on the horizontal member of the bell-crank lever w^4 it will only engage the same sufficiently to cause the pawl w^5 to move the ratchet W, through the ratchet-segment w^3, forward one tooth. The spring w^{19}, which is attached at one end to a fixed pin projecting from the plate F and at the other end to the pawl w^5, serves as a means for holding the pawl into engagement with the teeth of the segment w^3 and returning the bell-crank lever w^4 to its normal position after the pin w^{18} is disengaged from the cam p^{17}.

By means of the guideway p^{11} in the disk p^7 and the slot p^{16} in the segment p^{15}, as before stated, the cam p^{17} can be circularly adjusted completely around the ratchet P. The number of teeth on the members of the segment w^3 are seven, respectively, and this segment w^3 is so placed that the first tooth of the teeth on the same comes under the pawl w^5 during the last engagement between the pawl n^7 and the teeth of the ratchet O before the gaps o^{13} are reached. If the adjustments of the actuating-pawls are such that the ratchet P turns one or more equal number of times during one-half of a revolution of the ratchet O, there will be no stops in the action of the mechanism. Under these adjustments during the return stroke of the pawl n^7 after it has made its last engagement with the ratchet O previous to one of the gaps o^{13} coming under said pawl the cam p^{17} comes into engagement with the pin w^{18} on the bell-crank lever w^4 and actuates it, and thereby moves the ratchet W forward one tooth, which closes the gaps o^{13} this extent, the result being that the pawl n^7 engages the first tooth on the opposite side of the gap, and there is no stop in the action of the mechanism, as before stated. The adjustment of the segment p^{15} and through it the cam p^{17} determines the relative actuating position of the mechanisms. If the pawls are adjusted so their ratio of action is the same as above mentioned, then there will be no stops in the action of the mechanism; but if the ratio is not as above mentioned then there will be stops in the action of the mechanism. This adds largely to the variety of stitches, for, as it is of course understood, these stops in the mechanism change the pattern or stitch. For example, if the stroke of the pawl n^7 is the extent of six teeth of the ratchet O and the extent of the stroke of the pawl p^5 is six teeth of the ratchet P one of the gaps o^{13} will reach the pawl n^7 in four stitches, and as there is only one cam on the segment p^{15} there will be eight stitches made before the cam p^{17} on the same reaches the pin w^{18} on the bell-crank lever w^4. Consequently the mechanism acting on the lateral movements of the needle will remain at rest during four stitches. It is of course understood that if one of the ratchet-wheels is turned out of its relative position with re-

spect to the other the ratchet O will, when one of the gaps is reached, remain at rest until the cam p^{17} turns it into engagement with its actuating-pawl again, when the relative position between the wheels will be reëstablished. By adjusting the segment w^8 so the slot w^7 will permit the connection w^{16} to move, and through it the ratchet W, the extent of two teeth it is evident that the ratchet-wheel O will stop each time one of the gaps o^{13} reaches the actuating-pawl and will remain at rest until the cam p^{17} engages the pin w^{18} on the bell-crank lever w^4 twice.

If the disk z', with the two cams Z, is used, the duration of the stops in the ratchet O will be one-half as long as when the disk p^{15} (with only one cam) is used, provided, of course, the extent of the stroke of the pawls is the same in both cases.

In the claims I shall use the term "stitch-forming mechanism" to designate the mechanism or a part of the mechanism which acts on the thread or handles the same and the term "feed mechanism" to designate the mechanism or a part of the mechanism which acts on or handles the material being operated upon.

What I claim as new is—

1. The combination with a sewing-machine having stitch-forming mechanism, means for positioning said stitch-forming mechanism comprising an intermittently-rotating wheel, feed mechanism, means for regulating the direction and length of said feed comprising a second intermittently-rotating wheel, of means adapted to automatically place the angular position of a predetermined part of one of said wheels relative to the angular position of a predetermined part of the other of said wheels.

2. The combination with a sewing-machine having stitch-forming mechanism, means for positioning said stitch-forming mechanism comprising a cam, means for operating the said cam, feed mechanism, means for regulating the direction and length of said feed comprising a second cam, means for operating the said second cam, of means adapted to automatically place the angular position of a predetermined part of one of said cams relative to the angular position of a predetermined part of the other of said cams.

3. The combination with a sewing-machine having stitch-forming mechanism, means for positioning said stitch-forming mechanism comprising a cam, means for operating the said cam, feed mechanism, means for regulating the direction and length of said feed comprising a second cam, means for operating the said second cam, and means adapted to angularly adjust the said cams relative to each other, of means adapted to automatically place the angular position of a predetermined part of one of said cams relative to the angular position of a predetermined part of the other of said cams.

4. The combination with a sewing-machine having stitch-forming mechanism, means for positioning said stitch-forming mechanism comprising a ratchet-wheel, means for operating the said ratchet-wheel, feed mechanism, means for regulating the direction and length of said feed comprising a second ratchet-wheel, means for operating said second ratchet-wheel, of means adapted to automatically place the angular position of a predetermined part of one of said ratchet-wheels relative to the angular position of a predetermined part of the other of said ratchet-wheels.

5. In combination in a sewing-machine, a stitch-forming mechanism, a feed mechanism, a ratchet-wheel, a second ratchet-wheel, means adapted to give the said ratchet-wheels an alternating intermittent movement, and means adapted to automatically turn one of said ratchet-wheels into a predetermined angular position relative to a predetermined angular position of the other of said ratchet-wheels, and a connection between one of said ratchet-wheels and the stitch-forming mechanism and the other of said ratchet-wheels and the feed mechanism.

6. In combination in a sewing-machine, a stitch-forming mechanism comprising a vertically-reciprocating needle-bar mounted and adapted to move laterally, means adapted to move the said needle-bar laterally comprising a ratchet-wheel, means for operating the said ratchet-wheel, a second ratchet-wheel, means for operating said second ratchet-wheel, and means operated through the movement of the said second ratchet-wheel adapted to automatically turn the first ratchet-wheel into a predetermined angular position relative to the said second ratchet-wheel.

7. The combination with a sewing-machine having stitch-forming mechanism, means for positioning said stitch-forming mechanism comprising a ratchet-wheel, an actuating-pawl adapted to engage said ratchet-wheel, feed mechanism, means for regulating the direction and length of said feed comprising a second ratchet-wheel, a second actuating-pawl adapted to engage the said second ratchet-wheel, of means operated through the movements of the first ratchet-wheel adapted to place the first actuating-pawl out of operative engagement with the said first ratchet-wheel, and means operated through the movements of the second ratchet-wheel adapted to replace the first actuating-pawl into operative engagement with the first ratchet-wheel.

8. The combination with a sewing-machine having stitch-forming mechanism comprising a vertically-reciprocating needle-bar adapted to move laterally, means for moving the same laterally comprising a ratchet-wheel, and an actuating-pawl in engagement with the same, of means adapted to automatically place the finishing of a predetermined lateral movement of the needle-bar relative to the finishing of a predetermined stroke of the aforesaid actuating-pawl.

9. In combination in a sewing-machine,

stitch-forming mechanism comprising a vertically-reciprocating needle-bar adapted to move laterally, means for moving the said needle-bar laterally comprising a ratchet-wheel, an actuating-pawl in engagement with said ratchet-wheel, a feed mechanism, means for regulating the direction and length of said feed comprising a second ratchet-wheel, a second actuating-pawl in engagement with the said second ratchet-wheel, and means adapted to automatically place the finishing of a predetermined lateral movement of the needle-bar relative to the finishing of a predetermined movement of the feed.

10. In combination in a sewing-machine, a stitch-forming mechanism, a pawl-actuated toothed wheel, a connection between said wheel and the stitch-forming mechanism, one or more gaps in the teeth of said toothed wheel, a second toothed wheel, one or more gaps in the teeth of said second toothed wheel, a connection between said first and second toothed wheels adapting the latter to turn a predetermined extent and then to engage said first toothed wheel, a second pawl adapted to engage said second toothed wheel, and adjustable means independent of the action of said first toothed wheel adapted at intervals to actuate the said second pawl.

11. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move laterally, mechanism adapted to move the same laterally, and a reversible feed mechanism, of means adapted automatically to reverse or change the said reversible feed mechanism comprising a lever rigidly mounted on the feed-regulating shaft in the outer end of which is formed a groove concentric with the fulcrum of the lever, an arm loosely mounted on the aforesaid feed-regulating shaft in the outer end of which is an indicator, an adjusting connection between the arm and the indicator, an oscillating lever, and a connection between the arm and said oscillating lever.

12. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move or vibrate laterally, of means adapted to vibrate laterally the said needle-bar and automatically move laterally the working position of said vibrations, comprising a bell-crank lever, and means for oscillating the same, a lever fulcrumed on one member of the bell-crank lever, a connection between one end of the same and the needle-bar, a vibrating lever, and a connection between the same and the other end of the lever fulcrumed on the bell-crank lever.

13. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move or vibrate laterally, of a bell-crank lever and a connection between the same and the needle-bar, a segment-lever, a connection between the same and the bell-crank lever, a slide, a connection between the slide and the segment-lever, and means adapted to reciprocate the slide.

14. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move or vibrate laterally, of a segment-lever and means adapted to vibrate the same, an auxiliary piece attached to said segment-lever adapted to be adjusted laterally thereon, and a connection between said piece and the aforesaid needle-bar.

15. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move or vibrate laterally, of a segment-lever and means adapted to vibrate the same, a second segment-lever the center of fulcrum of which is the same as said first segment-lever, an adjustable connection between said segment-levers, and a connection between one of said levers and the needle-bar.

16. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move or vibrate laterally, of a stud, a segment-lever composed of two members fulcrumed on said stud, an adjustable connection between said members, an actuating device in engagement with one of said members, and a connection between the other one of said members and the needle-bar.

17. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted in a gate, said gate adapted to move or vibrate laterally, of an operatively-mounted segment-lever composed of two members, an adjustable connection between said members, a curved slot in one of said members, a shoe adapted to slide in said slot to and from the center of the fulcrum of said lever, a link, one end of which is connected with the aforesaid gate and the other end of which is operatively connected with the aforesaid shoe, and means adapted to automatically reciprocate the shoe.

18. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted in a gate or frame and a complemental stitch-forming mechanism, of a fixed stud on which one end of an actuating segment-lever is fulcrumed, a downwardly-extending sleeve serving as a bearing for the same, an annular piece having an upwardly-extending boss operatively mounted on said sleeve, an upwardly-extending boss formed on the lower end of the segment-lever, an auxiliary plate, the upper end of which is rigidly attached to the boss extending upwardly from the annular piece and the other end adjustably attached to the boss extending upwardly from the segment-lever, a link, a connection between one end of said link and the needle-bar gate, and a curved slot in the auxiliary plate in which the other end of said link is connected.

19. The combination with a sewing-machine having a vertically-reciprocating needle-bar

mounted and adapted to move laterally, of the following means for vibrating the said needle-bar laterally and automatically increasing the extent of the said lateral vibrations, a vibrating lever, a lever K, a connection k^3 between one end of the lever K and the needle-bar, a connection k' between the other end of the lever K and the said vibrating lever, a lever M, and a connection m' between the same and the connection k', substantially as described.

20. The combination with a sewing-machine having a vertically-reciprocating needle-bar mounted and adapted to move laterally, of the following means for vibrating the said needle-bar laterally and automatically increasing the extent of the said lateral vibrations, a vibrating lever, a lever K, a connection k^3 between one end of the lever K and the needle-bar, a connection k' between the other end of the lever K and the said vibrating lever, a lever M, and a connection m' between the same and the connection k'.

21. The combination with a sewing-machine having stitch-forming mechanism comprising a vertically-reciprocating needle-bar adapted to move laterally, mechanism for moving the needle-bar laterally comprising a ratchet-wheel, an actuating-pawl in engagement with the said ratchet-wheel, feed mechanism, means adapted to regulate the direction and length of said feed comprising a second ratchet-wheel, an actuating-pawl in engagement with the said second ratchet-wheel, of means in combination with the aforesaid first ratchet-wheel adapted to place the actuating-pawl out of operative engagement with the teeth of the same, means adapted to replace the pawl into operative engagement with the first-mentioned ratchet-wheel consisting of the segment p^{15}, the cam p^{17} formed thereon, and means for mounting and adjusting the said segment on the second ratchet-wheel.

22. In combination in a sewing-machine, stitch-forming mechanism comprising a reciprocating and laterally-moving needle, feeding mechanism, means for automatically controlling the lateral movements of the needle and the movements of the feed mechanism comprising a plurality of actuated wheels, means for automatically placing the angular position of said wheels relative to each other, and means for automatically arresting at intervals the movement of one of said wheels.

23. In combination in a sewing-machine, stitch-forming mechanism comprising a reciprocating and laterally-moving needle, feeding mechanism, means for automatically controlling the lateral movements of the needle and the movements of the feed mechanism comprising a ratchet-wheel, a second ratchet-wheel, a cam and means for operating the same, a lever S in connection with the said cam, means intermediate the lever S and the second ratchet-wheel whereby the latter is operated from the movements of the lever S, a connection between the second ratchet-wheel and the feed mechanism, a lever N, a connection between the lever N and the lever S, a connection between the lever N and the first ratchet-wheel, and means intermediate the first ratchet-wheel and the needle whereby the lateral movements of the same are automatically controlled.

24. In combination in a sewing-machine, stitching mechanism, feeding mechanism, mechanism for controlling the movements of one of said mechanisms comprising a ratchet-wheel, means for operating the said ratchet-wheel comprising a pawl, a second ratchet-wheel, means for operating the second ratchet-wheel, and means intermediate the said second ratchet-wheel and the aforesaid pawl whereby the pawl is intermittently actuated from the movement of the second ratchet-wheel.

25. In combination in a sewing-machine, feeding mechanism, stitch-forming mechanism comprising a reciprocating and laterally-moving needle, means for controlling the lateral movements of the needle comprising a ratchet-wheel, means for operating the said ratchet-wheel comprising a pawl-lever, a second ratchet-wheel and means for operating the same, a cam operated from the movements of the said second ratchet-wheel, and means intermediate the said cam and the aforesaid pawl-lever whereby the pawl-lever is actuated from the movements of the cam.

26. In combination in a sewing-machine, stitch-forming mechanism comprising a reciprocating and laterally-moving needle, means for controlling the lateral movements of the needle comprising a ratchet-wheel, means for operating the said ratchet-wheel comprising a pawl suitably mounted to engage the same, a second ratchet-wheel and means for operating the same, a segment mounted on the said second ratchet-wheel and adapted to be circularly adjusted thereon, a cam formed on the said segment and means interposed between the cam and the aforesaid pawl whereby the pawl is operated from the movement of the cam.

27. In combination in a sewing-machine, stitch-forming mechanism comprising a reciprocating needle-bar adapted to be moved laterally, mechanism for moving the said needle-bar laterally comprising a ratchet-wheel, an actuating-pawl for operating the said ratchet-wheel, a second pawl suitably mounted to operate at intervals the said ratchet-wheel, feed mechanism, mechanism for controlling the said feed mechanism comprising a second ratchet-wheel, and means intermediate the second ratchet-wheel and aforesaid pawl whereby the said second pawl is operated from the movements of the second ratchet-wheel.

28. In combination in a sewing-machine, stitch-forming mechanism comprising a reciprocating needle-bar adapted to be moved

laterally, mechanism for moving the said needle-bar laterally comprising a ratchet-wheel, means for operating the said ratchet-wheel comprising a pawl-lever, a pawl adapted to engage the said ratchet-wheel carried by the said pawl-lever, a second ratchet-wheel, means for operating the said second ratchet-wheel, means carried by the second ratchet-wheel for moving the aforesaid pawl-lever in one direction, and means independent of the second ratchet-wheel for moving the said pawl-lever in an opposite direction.

29. In combination in a sewing-machine, stitch-forming mechanism, feed mechanism, mechanism coöperating with the stitch-forming mechanism comprising a ratchet-wheel, a pawl-lever, a pawl adapted to engage the said ratchet-wheel mounted on the said pawl-lever, a second ratchet-wheel and means for operating the same, a cam carried by the second ratchet-wheel adapted to operate the aforesaid pawl-lever in one direction, and means separate from the said second ratchet-wheel for operating the said pawl-lever in the opposite direction.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM N. PARKES.

Witnesses:

EUGENIE P. HENDRICKSON,

G. W. EISENBRAUN.