

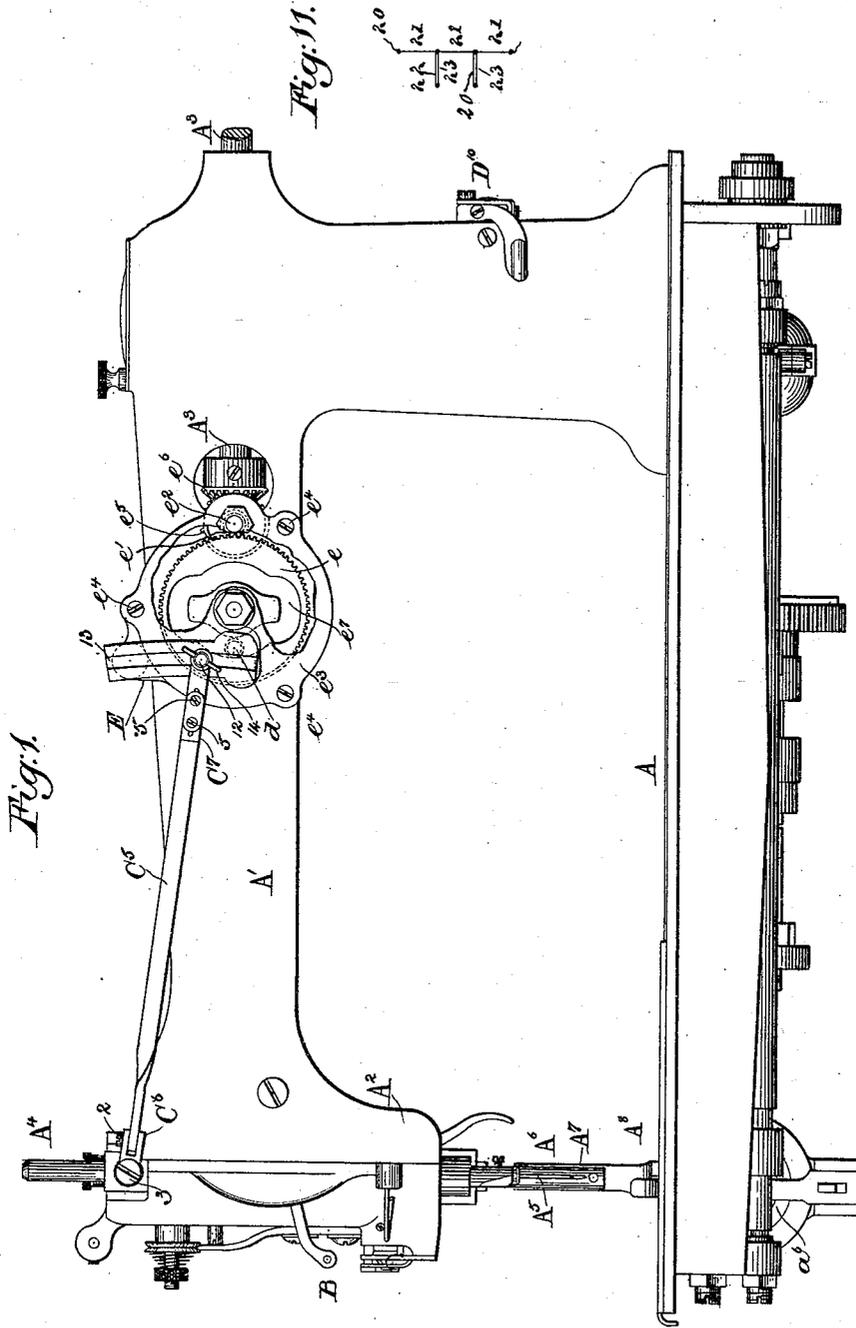
(No Model.)

3 Sheets—Sheet 1.

G. H. DIMOND.
SEWING MACHINE.

No. 479,739.

Patented July 26, 1892.



Witnesses:
Fred. S. Green of
Edgar A. Goblin

Inventor:
George H. Dimond,
by Lemby & Gregory Attys.

(No Model.)

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Fig. 2.

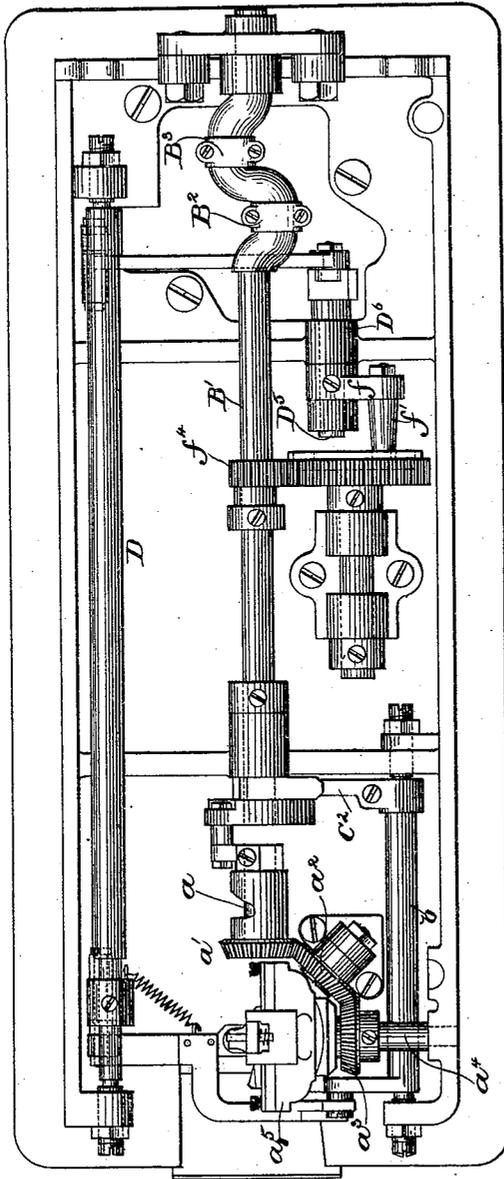


Fig. 3.

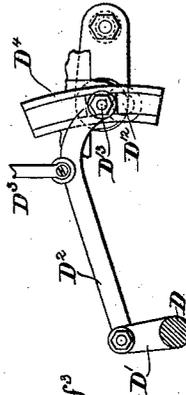
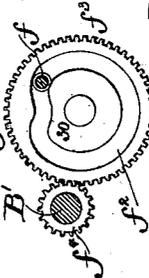


Fig. 4.



Witnesses:
Fred S. Greenleaf
Edgar A. Goddard

Inventor:
George H. Dimond.
by Lemby & Gregory attys.

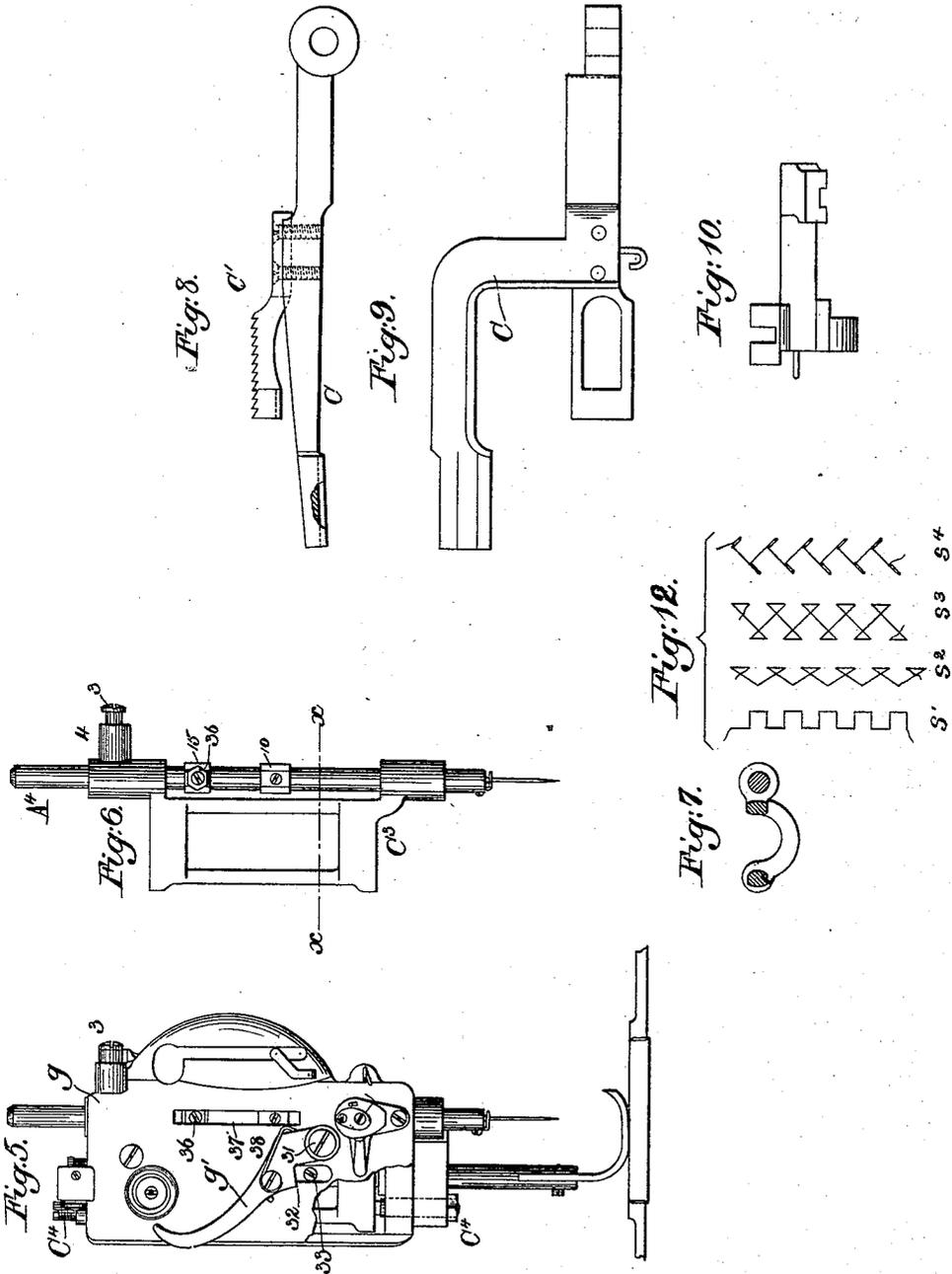
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3 Sheets—Sheet 3.

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by Lemby & Gregory attys.

UNITED STATES PATENT OFFICE.

GEORGE H. DIMOND, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE
WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 479,739, dated July 26, 1892.

Application filed November 25, 1890. Serial No. 372,574. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. DIMOND, of Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object the production of a machine by which to produce a great variety of different stitches for purposes of ornamentation, &c.

In the mechanism to be described the reciprocating needle-bar has imparted to it an intermitting vibratory motion under the control of the pattern, whereby the needle may be made to descend and rise and then descend again either in the same spot or another spot at will, according to the particular stitch to be made, these vibrations to the right or to the left depending upon the shape of the pattern, deriving its motion from the shaft or devices instrumental in producing the reciprocating motion of the needle. Co-operating with this needle-bar is a feed-bar, which is also intermitting in its movement, and in addition to this intermitting movement the feed-bar may be so controlled that it will engage the material as it rises and feed it either forward or backward, the feed bar not, however, having imparted to it any lateral motion.

It is immaterial in my invention what may be the form of stitch-forming device below the bed-plate—that is, whether a shuttle or other under-thread carrier or device be used to co-operate with the needle in the formation of the stitch.

In the form in which my invention is herein embodied the pattern for controlling the lateral vibrations of the needle has two throw-points and is so speeded that it rotates once while the needle-actuating shaft moves six times for the formation of six stitches, and the pattern for controlling the feeding movement has, as shown, one throw-point, and it is speeded to rotate once to each three movements of the under shaft, which imparts motion to the feed-bar.

The pattern device controlling the needle's vibrations is consequently so arranged that

it may move the needle to form any ornamental stitch made by repeating a three-stitch figure. In the production of a three-stitch figure by means of the pattern-wheels represented in the accompanying drawings the needle makes two movements laterally—say one to the left and the other to the right—thus making two stitches, while the material remains at rest, and then the needle rises and remains out of the material while the feeding mechanism operates to feed the material in the direction of the length of the seam or line of stitching, and the needle then descends and rises vertically or without lateral movement for the third stitch. By altering the shape of the pattern to control the intermitting action of the feed-bar the machine may with the same pattern controlling the needle-bar be made to make a variety of three-stitch figures, and the particular shape of the pattern for controlling the lateral movements of the needle-bar may be varied according to the figure to be made and by changing the relative speeds of the pattern which controls the vibrations of the needle-bar with relation to the movements of the needle-bar-actuating shaft ornamental stitches made up of figures produced by two, three, four, or more separate stitches may be made. In the production of all these varieties of stitches care must be taken that the time of the action of the feed and of the needle be so controlled that their movements together or in opposition are such as to make each stitch in the desired direction. The feed-bar may be so operated as to remain at rest during any two consecutive stitches, or it may be moved backward or forward between any consecutive stitches, such provision enabling a great variety of stitches to be formed.

The particular features of my invention will be referred to in the specification and pointed out in the claims, at the end thereof.

Figure 1 in side elevation, partially broken out, shows a sewing-machine embodying my present invention; Fig. 2, an under side view thereof; Fig. 3, a detail illustrating part of the feeding mechanism; Fig. 4, a view of the pattern-surface for controlling the intermitting motion of the feed-bar through its usual actuating mechanism; Fig. 5, a left-hand end

view of the machine shown in Fig. 1; Fig. 6, a detail illustrating the needle-bar frame and needle-bar and needle; Fig. 7, a cross-section in the line *x*, Fig. 6; Figs. 8, 9, and 10, details of the feed-bar. Fig. 11 represents a three-stitch figure such as will be made by the cams herein shown, and adjusted as represented in the drawings, and Fig. 12 shows a variety of three and four stitch figures which may be made by changing the pattern-surfaces shown for others.

The bed-plate A, overhanging arm A', head A², needle-bar-actuating shaft A³, needle-bar A⁴, needle A⁵, presser-bar A⁶, presser-foot A⁷, take-up B, under crank-shaft B', connected by links B² B³ with the needle-bar-actuating shaft A³, the short shaft *a*, the gears *a'* *a''* *a'''*, the loop-taker guide *a⁵*, and the loop-taker *a⁶* therein are and may be all substantially as in United States Patent No. 419,541, dated January 14, 1890, it representing a modified form of Wheeler & Wilson machine, the particular feature of the said patent; No. 419,541, being the transverse arrangement of the loop-taker and the actuating means therefor.

The feed-bar C, having the feed-points C', the rock-shaft *b* to raise and lower the feed-bar, the forked arm C², slotted to embrace a feed-cam on the shaft B', the feed-reciprocating rock-shaft D, having an arm D', the pivoted connection D², the link D³, jointed to it and extended up and connected to the feed-regulating lever D¹⁰, the slide-block D¹², mounted upon a stud D¹³ of the connection D² and extended into the curved guideway in the vibrating feed-actuating segment D⁴, fast on a short shaft D⁵, mounted in bearings D⁶, are and may be all as in United States Patent No. 331,174, dated November 24, 1885, in which patent the feed-regulating segment has a constant uniform vibration, the length of feed being regulated—that is, made longer or shorter—by turning the feed-regulating lever D⁶ to move the slide-block D¹² toward and from the center of motion of the segment D⁴.

In this present invention the needle-bar A⁴ is adapted to be moved vertically in a needle-bar frame C³, mounted upon pivot-screws C⁴, so that the said frame may be swung laterally or moved horizontally, as may be desired.

In practice the needle-bar will be reciprocated vertically by or through a link connected with a crank at the front end of the shaft A³, the said link being jointed to a stud or projection in the rear side of a collar 10, attached to the needle-bar, all as common in the patent referred to and in the Wheeler & Wilson machine.

To vibrate or swing the needle-bar frame laterally, I have provided the said frame with a stud-screw 3, to which is applied a block C⁶, having pivoted to it at 2 a connecting-rod C⁵, provided at its opposite end with an adjustable block C⁷, connected to the link by suitable screws 5, extended through slots in the block and into the said connecting-rod. This

block or end piece C⁷ receives a screw 12, the opposite end of which carries a shoe or block mounted loosely thereon, which shoe or block enters the slot 13 in the vibrating segment E, having near its upper end a laterally-extended shaft, which is fitted into a suitable bearing mounted upon the top of the overhanging arm, so that the said segment may be swung or vibrated. The screw 12 has applied to it a thumb-nut 14, which when loosened enables the shoe to be raised or lowered in the groove of the segmental arm, the rotation of the thumb-nut in the opposite direction securing the shoe in adjusted position, the adjustment of the shoe altering the extent of lateral throw imparted to the needle-bar frame by or through the segment.

The segment E has at its lower end a roller or other stud *d*, which is acted upon by the pattern-surface employed to control the intermitting lateral movements of the needle-bar frame. The pattern or pattern-surface is represented as a wheel *e*, having at one side a cam-groove in which is entered the said roller or other stud *d*. The wheel *e* referred to is toothed and is engaged by the teeth of a pinion *e'*, (partially shown in Fig. 1,) it being mounted upon a stud *e²*, carried by the plate *e³*, which is attached to the overhanging arm by the screws *e⁴*, the said pinion having connected to or forming part of it a beveled gear *e⁵*, which is engaged and rotated by a beveled gear *e⁶*, fast on the needle-bar-actuating shaft A³. As represented, the cam-groove *e'* in the pattern-surface has two throw-points and the gears referred to are of such size with relation to each other and the rotation of the shaft A³ that the pattern-surface rotates once while the needle-bar-actuating shaft A³ rotates six times, and as a result thereof the needle-bar frame is moved laterally intermittingly, thus enabling the needle to penetrate the material at such points as to make an ornamental stitch, the stitch produced being that represented enlarged, (see Fig. 11,) wherein 20 designates, it may be considered, the starting-point of the ornamental stitch, 21, 22, and 23 in their order representing the steps taken by the needle.

In accordance with my invention, instead of vibrating the rock-shaft D⁵, having the segmental arm D⁴, at each rotation of the shaft B', as in the patent, No. 331,174, referred to, I have attached to the said rock-shaft D⁵ an arm *f*, provided with a suitable roller or other stud *f'*, which is actuated by the feed-controlling pattern-surface, herein represented as a cam having a groove *f²*, which is entered by the said roller or other stud, the said cam-groove being in a wheel *f³*, toothed at its periphery and engaged by a pinion *f⁴*, fast on the shaft B'. The pattern-surface last described is such and the gearing for actuating it is such as to cause the rotation of the pattern-surface once during each three rotations of the under shaft, the said pattern-surface having one throw-point, and consequently the

feed-bar is moved longitudinally or to effect the feed of the cloth once for each three stitches, it being understood that as long as the roller or other stud referred to is traveling in the part of the cam-groove f^2 , which is substantially circular, the radius-bar D^4 is not vibrated to cause the feed to move the material longitudinally; but as soon as the roller or other stud approaches the depression 30 of the pattern-surface, then in going into and out of said depression the segment D^4 is vibrated to move the feed-bar and cause it to move the material in the direction in which the feed-bar is moved after being raised in contact with the cloth.

From the foregoing it will be understood that by changing the pattern-surfaces for others having pattern-surfaces of other shape a great variety of ornamental stitches may be automatically produced.

The machine herein shown has pivoted upon the face-plate g at 31 a lever g' , the upper end of which is adapted to be thrown forward between the usual tension-disks of the needle-thread tension device, to thus separate the said disks and relieve the needle-thread from tension, as when the material is to be taken out of the machine, at which time it is desired that the needle-thread rend freely through the eye of the needle, which it could not do without straining the needle if the tension device produced tension thereon. This lever g' has a shoulder 32, which is engaged by a pin or projection 33, attached to the presser-bar and extending through a slot in the face-plate when the said presser-bar is lifted in usual manner by the usual presser-foot lifting-lever 34 to lift the presser-foot from the work prior to its removal.

The needle-bar has applied to it a collar 15, having a stud 36, extended outwardly through the slot 37 in the face-plate, so that when the machine is again started, the material having been properly put below the presser-foot, the pin 36 in the first descent of the needle-bar far enough to make a stitch strikes the spring 38, connected to the lever g' , and turns the said lever in the direction to remove its upper end from between or from contact with the tension device, so as to let the tension device act upon the needle-thread.

Referring to Fig. 12, $s^1 s^2 s^3 s^4$ represent a variety of stitches which may be made on the machine shown by changing the shape of the pattern-surfaces and the relative speed of their rotation.

The action of the feed is as follows: The feed-point is raised and lowered at every revolution of the shaft B' , and whether when raised it moves forward or backward, taking the material with it, or remains at a standstill for the needle to make a stitch laterally at right angles to the line of feed, depends upon the configuration of the pattern-surface, which conforms to the design of the figure to be formed by the stitches.

This invention is not limited to the employment of the exact mechanism shown between the pattern-surface f^3 and the feed-bar by which to control its movement, as it is intended to include the use of any well-known equivalent devices capable of like operation under control of the pattern-surface.

I claim—

1. The feed-bar C, the feed-dog attached thereto, the rock-shaft D, the feed-adjusting link D^2 , jointed thereto, a rock-shaft D^5 , parallel to the rock-shaft D, said rock-shaft having a grooved segmental arm D^4 , which is entered by a stud of the said link, means to move the said link D^2 and place its stud more or less near the center of said rock-shaft to thereby regulate the length of stitch, an arm f , connected to the rock-shaft D^5 and provided with a stud f' , a pattern-cam having a groove to receive said stud f' and having a series of teeth, the shaft B' , means to rotate it, a loop-taker, devices between it and the said shaft to rotate the loop-taker, and a gear f^4 on the shaft B' to engage the teeth of and rotate the pattern-surface to determine the direction of feed, substantially as described.

2. The feed-bar C, the feed-dog attached thereto, the rock-shaft D, the feed-adjusting link D^2 , jointed thereto, a rock-shaft D^5 , parallel to the rock-shaft D, said rock-shaft having a grooved segmental arm D^4 , which is entered by a stud of the said link, means to move the said link D^2 and place its stud more or less near the center of said rock-shaft to thereby regulate the length of stitch, a rotating needle-bar-actuating shaft having a gear e^6 , a needle-bar having an eye-pointed needle, a horizontally-swinging needle-bar frame, connections between said shaft and needle-bar to reciprocate the latter vertically in said frame, the shaft B' , means to rotate it, a loop-taker, devices between it and the said shaft to rotate the loop-taker, a pattern-surface, gearing connecting said pattern-surface and the gear e^6 , connections comprising a vibrating slotted segment and block adjustable thereon between the pattern-surface and the said needle-bar frame to move the latter intermittently in a lateral direction, a feed-bar-actuating mechanism therefor, an arm f , connected to the rock-shaft D^5 and provided with a stud f' , a pattern-cam having a groove to receive said stud f' and having a series of teeth, and a gear f^4 on the shaft B' to engage the teeth of and rotate the pattern-surface between some stitches and not between other stitches, the combination being and operating, substantially as described, to enable a variety of stitches to be made, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE H. DIMOND.

Witnesses:

A. R. LACEY,
C. N. WORTHEN.