

F. W. OSTROM.

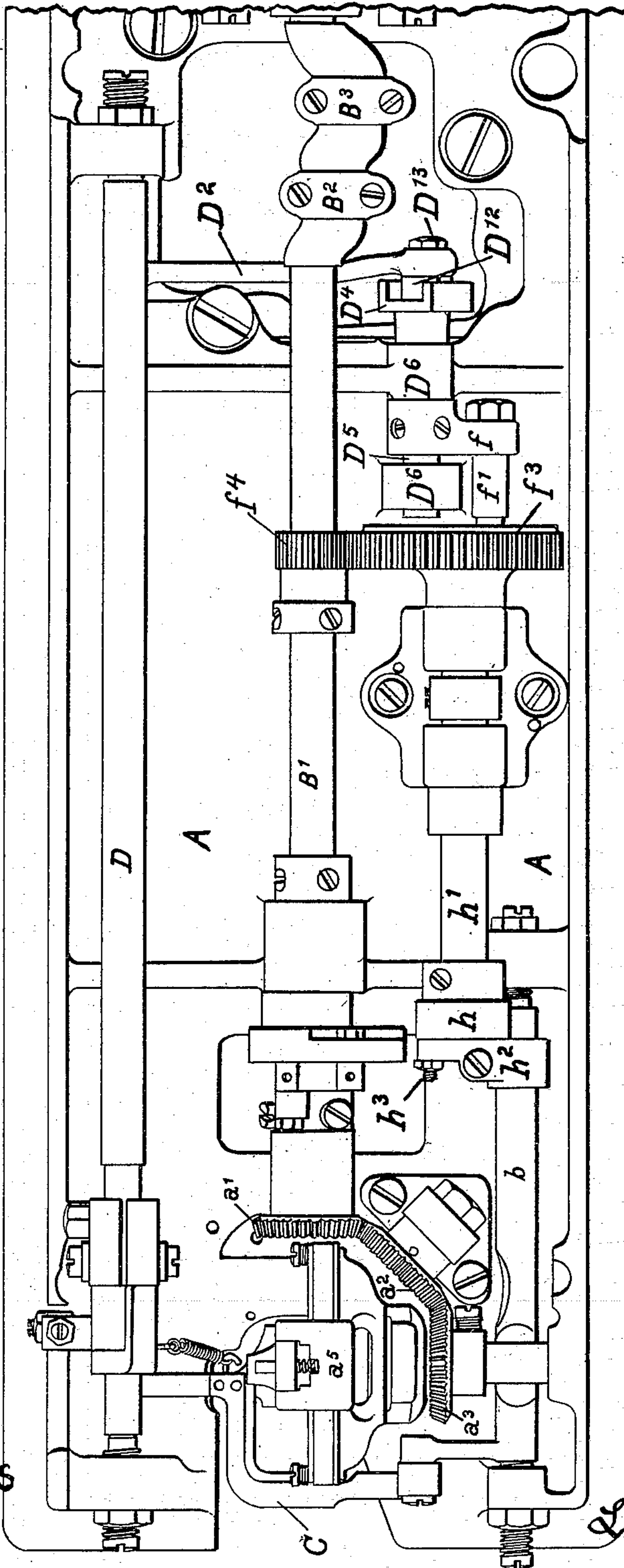
FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Mar. 3, 1898.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 2



Witnesses
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No. 651,930.

Patented June 19, 1900.

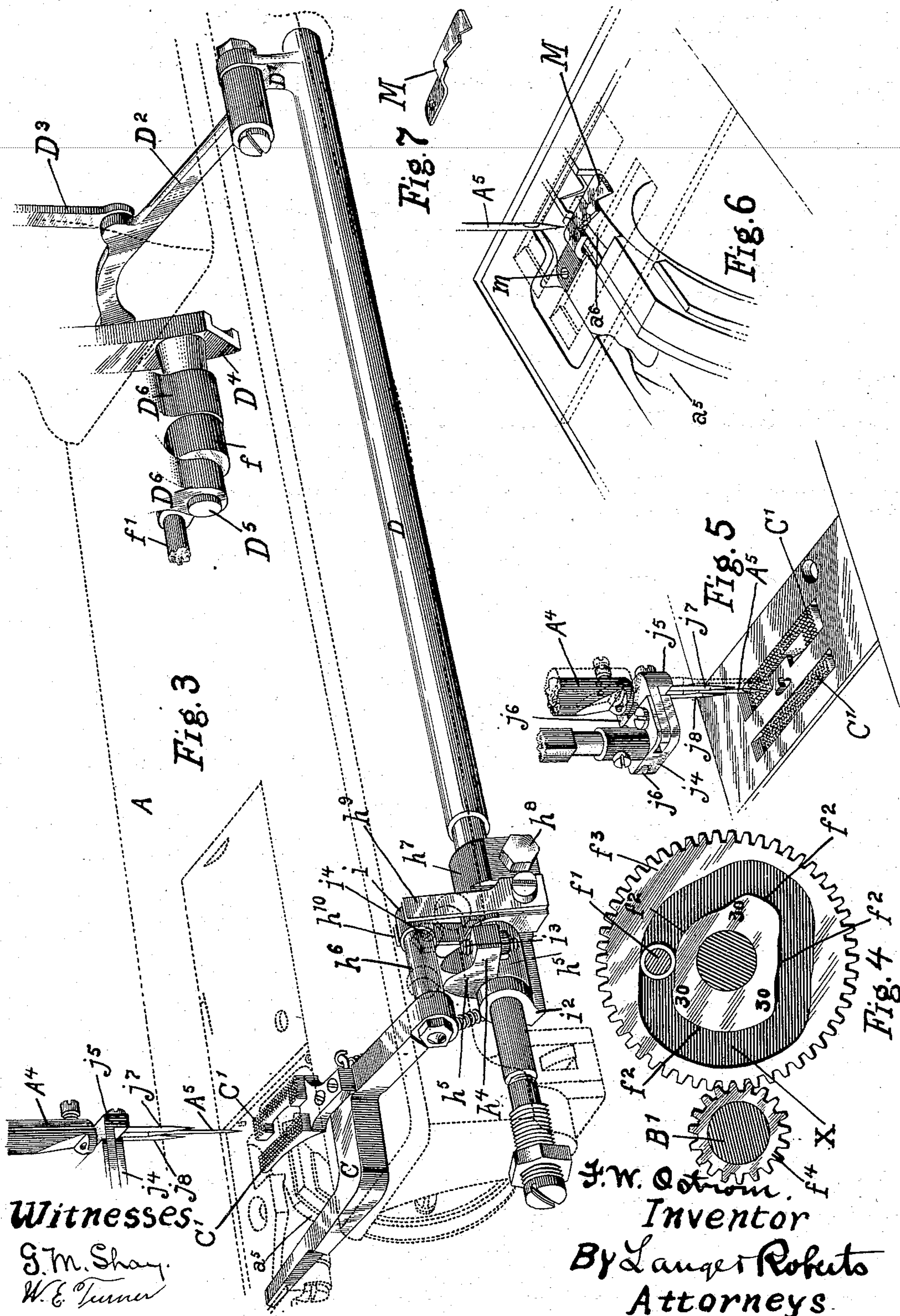
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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 651,930, dated June 19, 1900.

Application filed March 3, 1898. Serial No. 672,366. (No model.)

To all whom it may concern:

Be it known that I, FREELAND W. OSTROM, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

My improvements relate to sewing-machines preferably of that class known as "variety-stitch" machines. In the present instance, however, I have embodied my improvements in that form of Wheeler & Wilson machine known in the market to-day as a "hemstitch-machine," the general construction of which is shown and described in United States Letters Patent to G.H. Dimond, assignor to the Wheeler & Wilson Manufacturing Company, No. 479,739, granted July 26, 1892. The machine described in the Dimond patent referred to is a so-called "variety-stitch" machine, the particular form of stitch being dependent upon the form of the grooves in the pattern-cams.

My invention consists in improved mechanism to control the feed movements.

Referring to the drawings, Figure 1 is a front elevation of a well-known Wheeler & Wilson hemstitch-machine embodying my improvements. Fig. 2 is an under side view of the bed-plate and working parts connected therewith. Fig. 3 is a skeletonized or dotted-line perspective of the bed-plate of the machine and a portion of the attached operative mechanism, showing in full lines those parts of the feed mechanism to which my improved devices for the control of said feed have been applied. It also shows in full lines the usual needle-carrier, needle, piercer-carrier, piercer, and former, to which reference will be hereinafter made. Fig. 4 is a detail, partly in section, of the pattern-cam, showing its connection with the pinion on the main shaft. Fig. 5 is a broken detail showing in full lines the throat-plate, the feed-points, the needle-carrier, partly broken away, with its needle in full and dotted line position, the piercer-carrier, partly broken away, the piercer, and former, all of which will be referred to later on. Fig. 6 is a detail showing a thread-leader in operative position with relation to the throat-plate and needle. Fig. 7 is a perspec-

tive of the thread-leader to more fully indicate its construction. Fig. 8 is a diagram intended to show the relative action of the needle and feed movements in the operation of the machine. Fig. 9 is a perspective of the loop-taker.

The bed-plate A, the overhanging arm A', head A², needle-bar A⁴, needle A⁵, presser-bar A⁶, take-up B under crank-shaft B', connected by links B² B³ with the needle-bar-actuating shaft located in the overhanging arm, the gears a' a² a³, the loop-taker guide a⁵, the loop-taker a⁶, the feed-bar C, having the feed-points C', the rock-shaft b to raise and lower the feed-bar, the reciprocating rock-shaft D, having an arm D', the pivoted connection D² and 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-segment D⁴, fast on a short shaft D⁵, mounted in bearings D⁶, needle-bar frame C³, connecting-rod C⁵, provided at its rear end with an adjusting-block C⁷, connected to the link by suitable screws extended through slots in the block and into the said connecting-rod, the block or end piece C⁷, which 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, having 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 the lateral throw imparted to the needle-bar frame by or through the segment, the segment E, which has at its lower end a roller or other stud d, which is acted upon by a pattern-cam 40, employed to control the intermittent movements of the needle-bar frame, the arm f, provided with a suitable roller or other stud f', actuated by the pattern-cam controlling the feed movement, herein represented by a cam having a groove x, (see Fig.

4,) which is entered by the said roller or other stud f' , the said cam-groove being in a wheel f^3 , toothed on its periphery and engaged by a pinion f^4 , fast on the shaft B' , the pattern-cam last described being geared to the lower shaft one to three, so as to cause the rotation of the pattern-cam once during each three rotations of the under shaft, the said pattern-cam in the first instance having three throw-points whereby consequently the feed-bar is moved to effect the feed of the cloth once for each stitch, it being understood that as long as the roller or other stud referred to is traveling in the parts of the cam-groove f^2 which are substantially circular the radius-bar D^4 is not vibrated to cause the feed to move the material longitudinally, but that as soon as the roller or other stud approaches the eccentric portions 30 of the pattern-cam groove then 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, the face-plate g , the lever g' , and presser-foot-lifting lever 34. All the foregoing parts, with their described operations and functions, are substantially the same as the like-lettered parts shown and described in the above-mentioned Dimond patent, No. 479,739, to which reference may be made, excepting that the groove x in the pattern-cam f^3 is in the present instance, as has been pointed out, formed to effect the feed necessary to produce the stitching represented by the diagram Fig. 8, the groove in the pattern-cam 40, located in the overhanging arm for effecting the throw or vibration of the needle-bar-carrying gate C^3 , being formed to effect, in coöperation with the feed movement, the stitching before referred to, as represented by Fig. 8. It is pointed out in the Dimond patent that the pattern-cams may be changed or varied to provide various stitch designs, and in this instance the pattern-cam grooves have been so formed as to effect the stitch design shown in Fig. 8. The Dimond patent shows a presser-foot A^3 common to the ordinary sewing-machine, while in the present instance the presser-foot 20 is that usually employed in hemstitching. Further, in the present instance the oscillation of the rock-shaft b for controlling the vertical movements of the feed-points C' into and out of operative relationship with the material to be stitched is controlled by a cam h , mounted upon the pattern-cam-carrying shaft h' . The lever h^2 , mounted upon the rock-shaft b , carries at one end a suitable stud h^3 , carrying a roller, (not shown,) which coöperates with the periphery of the cam h , and the periphery of the cam h is formed and timed with relation to the pattern-cam controlling the feed movement so that the vertical movements of the feed-points will be properly related to the feed movements of the material.

In the form in which my invention is herein embodied the pattern-cam 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 rotates three times for the formation of three lock-stitches, and the pattern for controlling the feeding movement has, as shown, three throw-points and is speeded or rotated once to each three movements of the hook-driving shaft, which imparts motion to the feed-bar. The pattern device controlling the needle's vibration and feed movement of the material is consequently so arranged that it controls a three-stitch figure.

In the production of a three-stitch figure such as is necessary for producing a hem-stitch the grooves in the pattern-cams are formed so that the needle makes, first, a movement to the right while the material is advanced one feed movement, and, second, to the left while the material is again advanced one feed movement, and during the succeeding feed movement, which is in the opposite direction or toward the operator, the needle remains in the same vertical alinement until after the completion of the feed movement, when the needle is caused to descend and forms the completing stitch necessary to form the hemstitch.

Referring to the diagram represented by Fig. 8 and following the arrows numbered, consecutively, from "1" to "15," the feed and needle movement will be easily understood.

The object of my improvements—namely, the improvements in the feed mechanism—is to more accurately control the movement of the material in opposite directions.

Referring to Fig. 8, it will be understood that to properly form a hemstitch-figure it is necessary that the needle pierce the material a second time in the same place and after there have been two feed movements, and consequently after there have been two descents of the needle-bar, two feed movements forward, and one in the opposite direction, and that any variation of the feed movement of the material in either direction will prevent the needle from entering the same puncture a second time, and consequently the sewing-threads fail to bind in all of the warp or filling threads of the material and effect an open hemstitch such as is represented by Fig. 9, and my invention insures an equal feed of the material under all circumstances, so as to properly bind in the threads of the material.

Referring to Fig. 3, there is loosely mounted on the rocker-shaft D a lever h^5 , constructed with arms h^6 h^4 . The arm h^6 is suitably connected to the feed-bar C , carrying the feed-points C' , and receives motion to feed the material in opposite directions from the cam f^3 through connections f' , D^4 , D^2 , D' , and rocker-shaft D . The prior construction of this feed movement was to rigidly secure the lever h^5 to the rocker-shaft D and to depend upon a perfect construction and correct adjustment of the machine to effect a positive feed mo-

tion in opposite directions; but in practice it has been found impracticable to maintain such accurate construction and nicety of adjustment, and to remedy this difficulty I have
 5 provided the rocker-shaft D with a yoke h^7 , adjustably secured by the bolt h^8 , and provided said yoke with springs h^9 h^{10} , which at their upper ends bear against the roller i ,
 10 yoke h^7 being provided with an extension i^2 to hold the lever h^5 in its adjusted position on the shaft. The object of this form of construction is to control by a yielding connection the movement of the feed-bar C and feed-points
 15 C', carried by it.

It will be observed that without referring to the stop-screws i^3 i^4 the movement of the feed-bar C would depend upon the adjustment of the slide D^{12} in the segment D^4 , and
 20 without considering imperfect construction or lost motion the movement of the feed-bar C would be equal in opposite directions and in distance regulated by the position of the slide D^{12} in the segment D^4 .

Referring to Fig. 1, I have provided the arm h^4 of the lever h^5 with a stop-screw i^3 , which through the oscillating movement of the lever h^5 is caused to contact with the base-plate of the sewing-machine, and in the
 30 base-plate I have provided a stop-screw i^4 , against which the lever h^6 on its opposite throw is caused to contact. By this construction of parts I am enabled to get a positive and determinate feed of the material in
 35 both directions and in the following manner, to wit: first I adjust the stop-screws i^3 i^4 to suit the required feed, and then I adjust the block D^{12} to get an excess of feed, and thereafter in the operation of the mechanism the
 40 springs h^9 h^{10} take up or hold the excess of feed, as will be readily understood.

In the use of hemstitch-machines it has been common for years to employ one or more piercers operating in advance of the
 45 needle to pierce or puncture the goods, into which punctures the needle is intended to subsequently enter in the production of a hemstitch. These piercers have been usually mounted in a bar independent of the
 50 needle-carrier, and have operated to pierce the material in the same alinement, while the needle pierces the material in different alinements. I employ in combination with the usual needle a piercer operating in advance
 55 of the needle to provide punctures in the material into which the needle is to subsequently enter and also a former operating in rear of the needle, the design of which latter is twofold: first, to reopen the puncture
 60 previously made and thereafter more or less closed in the operation of the needle, the tension, &c., so as to provide by such reopening a clear path for the descent of the needle into that puncture in completing the necessary
 65 stitching operation in making the hemstitch figure, and, secondly, after the last entrance

into that puncture of the needle to again reopen and clearly define the form of the opening or puncture by a last entrance into that puncture of the former succeeding the last
 70 entrance into that puncture of the needle, so as to leave a sharply-defined, properly-outlined opening in the formation of the hemstitch-figure. By this dual operation of the former, succeeding in operation the use and
 75 functions of the piercer and of the needle, no loose or ungathered warp or filling threads are left in the hemstitch-figure, nor are any of the desired or designed openings of the hemstitch-figure more or less partially closed
 80 or disfigured in design or proportion in reference to others of the hemstitch design or figure. To effect this result, there must be the coöperation of a piercer to operate in advance of the needle, the operations of the
 85 needle itself, and a former to operate in rear of the needle. Mechanism for the effectuation of this result is shown herein as follows: Mounted in the face-plate g of the overhanging arm A' is a piercer-bar j , provided at its
 90 upper end with a collar j^2 , having an extension j^3 , the latter extending through a hole in the upper end of the needle-bar A^4 , permitting the needle-bar to vibrate in opposite directions and at the same time give to the
 95 piercer-bar a vertical movement in opposite directions. Secured to the lower end of the piercer-bar j is a clamp j^4 , provided with adjustable holding-clamps j^5 j^6 , the latter located in the rear of the needle and the former j^5 in
 100 advance or in front of the needle. In the clamp j^5 is secured the piercer j^7 , and in the clamp j^6 is secured the former j^8 . By operating the former j^8 in conjunction with the piercer j^7 the needle's descent, when caused
 105 to descend for the formation of a lock-stitch in alinement with the piercer and former, is next subsequent to either the action of the piercer or the former, according to the feed of the material in one or the other direction. 110

Referring to Fig. 8, supposing the needle to be puncturing the material at k , the former at k' , and the piercer at k^2 , the succeeding feed movement would be in the direction of the
 115 arrow V and the movement of the needle in the direction of the arrow U, and the next subsequent relative positions of the needle, piercer, and former would be the former would pierce the material at k^3 , the needle at
 120 k^2 , and the piercer at k^4 . Succeeding this would be a feed movement in the direction of the arrow T, which would cause the needle to descend at k^3 , the former at k' , and the piercer at k^2 , followed by a feed movement
 125 in the direction of the arrow V, which would cause the needle to descend at k^5 , the former at k^3 , and the piercer at k^4 , and so on in succession, insuring a puncturing of the material by either the piercer or the former just
 130 precedent to the needle's entering the material in the same alinement.

To better adapt a hemstitch-machine to the

demands of the market to-day in the production of sharp, clean, unsoiled hemstitch-work, I have provided a notched thread-leader M, located in close proximity to the rotating loop-taker a^6 and attached to the loop-taker guideway a^5 by the screw m . (See Figs. 6 and 7.)

Referring to Fig. 9, it is shown that the rim of the rotating loop-taker, that portion which rides in the recess of the loop-taker guide, is constructed much thinner than the more central portion. It will be observed that the back of the loop-taker is rounded out and that upon the front of the loop-taker is a beveled or cast-off portion to lead the needle-thread over and around the bobbin. For a considerable portion of the rotation of the loop-taker after the point of the loop-taker has entered the loop of the upper thread to carry it around the bobbin neither the cast-off portion of the loop-taker nor the swell constituting the back portion of the loop-taker affects the leading of the upper thread, and the tendency of the upper thread is to ride on each side of the rim of the rotating loop-taker. This contact with the loop-taker blackens or soils the thread prior to the action of the cast-off or bulging portion of the hook.

The thread-leader M is supplied to lead the thread in opposite directions and away from the rim of the loop-taker during the initial portion of the rotation of said loop-taker—that is, prior to the action of the cast-off or bulging portion of the hook. With the ordinary construction, such as is represented by the drawings, the thread-leader M controls the position of the upper thread for about one-third of the complete rotation of the loop-taker, which one-third rotation I term herein the initial portion of the rotation.

What I claim, and desire to secure by Letters Patent, is as follows:

1. In a sewing-machine, a stitch-forming mechanism comprising a cloth-feeding device and actuating mechanism therefor, said feeding device employing a feed-dog mounted below the cloth-plate of the sewing-machine and constructed to cooperate with a suitable cloth-presser mounted in the overhanging arm, a yielding connection between the feed-dog of the cloth-feeding device and said actuating mechanism, and stops to control the yieldingly-actuated movements of the feed-dog and thus limit the throw of the feed-dog to correspond with the predetermined spacing between stitches, substantially as described.

2. In a sewing-machine, a stitch-forming mechanism comprising a cloth-feeding device and actuating mechanism therefor, said feeding device employing a feed-dog mounted below the cloth-plate of the sewing-machine and constructed to cooperate with a suitable cloth-presser mounted in the overhanging arm, a yielding connection between the feed-dog of the cloth-feeding device and said actuating mechanism, means for adjusting the throw of the actuating mechanism and stops to control the yieldingly-actuated movements of the cloth-feeding device and thus limit the throw of the feed-dog to correspond with the predetermined spacing between the stitches, substantially as described.

Signed by me at Bridgeport, Connecticut, this 28th day of February, 1898.

FREELAND W. OSTROM.

Witnesses:

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