J. P. WEIS & C. E. JOHNSON.

MULTIPLE NEEDLE OVEREDGE STITCH FORMING MECHANISM.

APPLICATION FILED JUNE 7, 1909.

1,083,967. Patented Jan. 13, 1914.

4 SHEETS—SHEET 1.

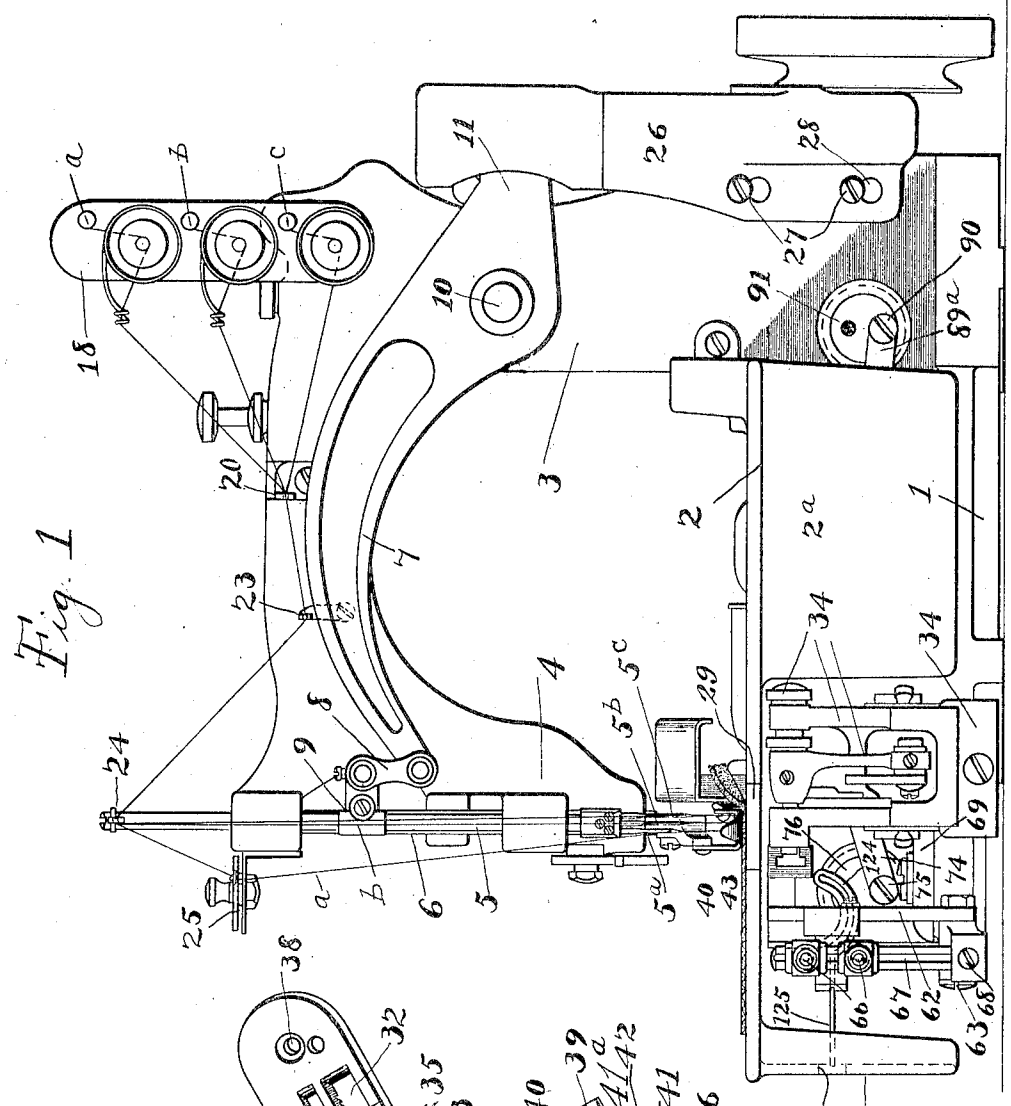


Fig. 1

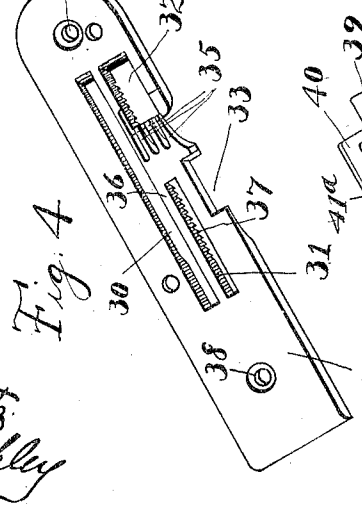


Fig. 4

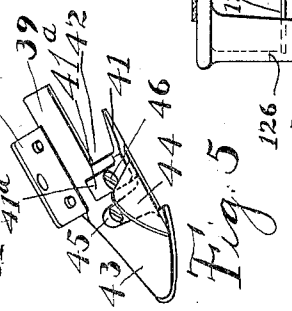


Fig. 5

WITNESSES:

M. Herskovitz.

C. J. Stickley.

INVENTORS:

John P. Weis and

By Carl E. Johnson.

Chas. McC. Chapman.

ATTORNEY

J. P. WEIS & C. E. JOHNSON.

MULTIPLE NEEDLE OVEREDGE STITCH FORMING MECHANISM.

APPLICATION FILED JUNE 7, 1909.

1,083,967. Patented Jan. 13, 1914.

4 SHEETS—SHEET 2.

Fig. 2

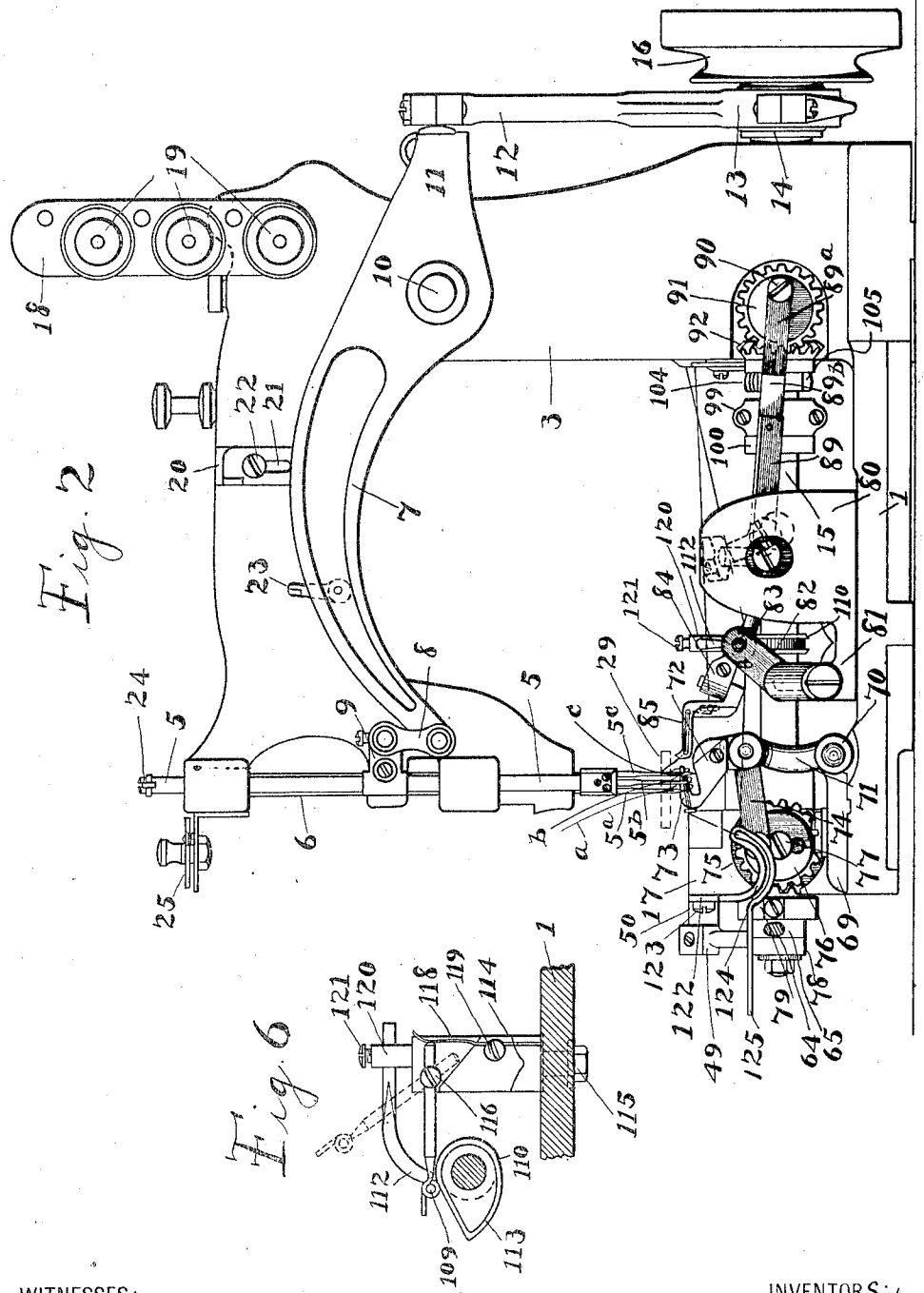


Fig. 6

WITNESSES:

M. Kerkovitz

C. J. Loechley

INVENTORS:

John P. Weis and

By Carl E. Johnson.

Chas. M. & C. Chapman.

ATTORNEY.

J. P. WEIS & C. E. JOHNSON.

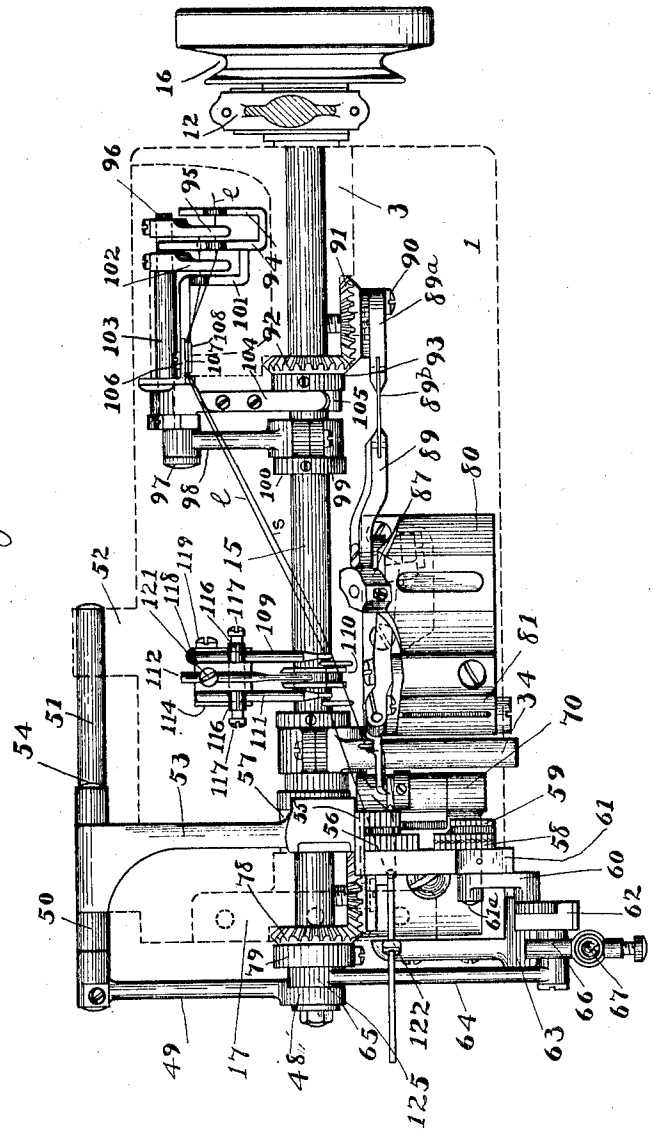
MULTIPLE NEEDLE OVEREDGE STITCH FORMING MECHANISM.

APPLICATION FILED JUNE 7, 1909.

1,083,967. Patented Jan. 13, 1914.

4 SHEETS—SHEET 3.

Fig. 3



WITNESSES:

M. F. Cockcroft

C. J. Stockley

INVENTORS:

John P. Weis and Carl E. Johnson.

BY

Chas. M. C. Chapman.

ATTORNEY.

J. P. WEIS & C. E. JOHNSON.

MULTIPLE NEEDLE OVEREDGE STITCH FORMING MECHANISM.

APPLICATION FILED JUNE 7, 1909.

1,083,967.

Patented Jan. 13, 1914.

4 SHEETS—SHEET 4.

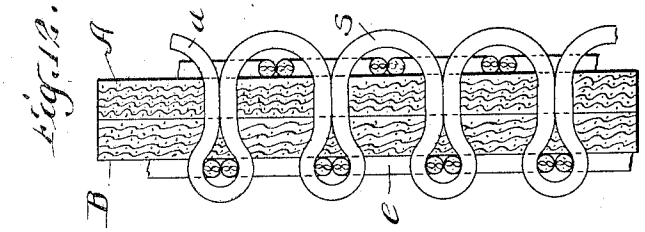


Fig. 12.

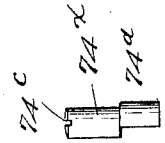


Fig. 9.

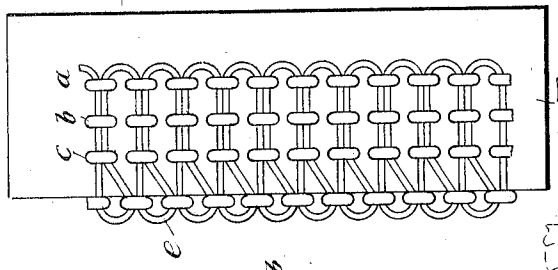


Fig. 11.

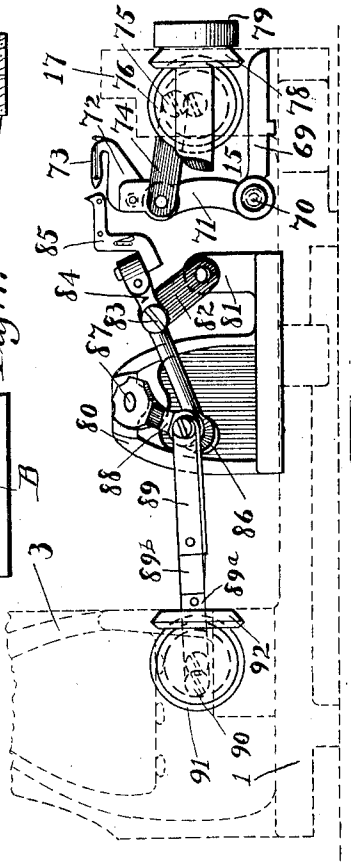


Fig. 7.

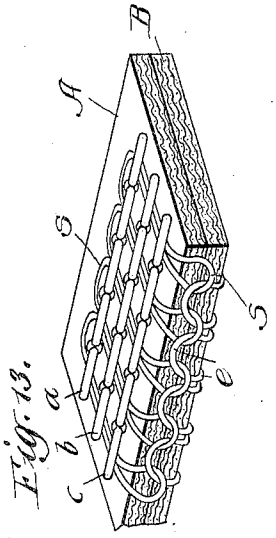


Fig. 13.

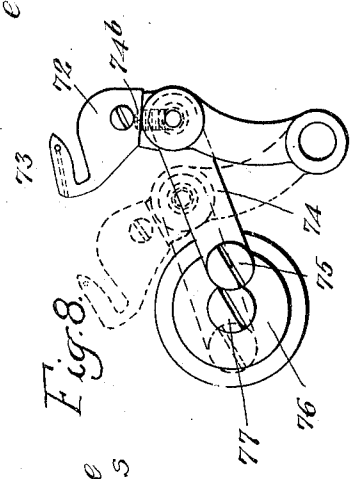


Fig. 8.

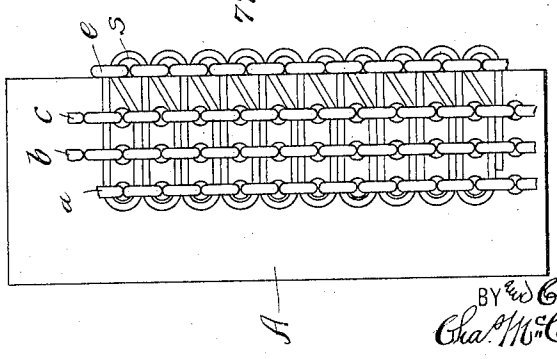


Fig. 10.

WITNESSES:

M. Keskovich

C. J. Stockley

INVENTORS:

John P. Weis

BY Carl E. Johnson

Chas. McC. Chapman

ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN P. WEIS AND CARL E. JOHNSON, OF NYACK, NEW YORK, ASSIGNORS TO LUCIUS N. LITTAUER, OF GLOVERSVILLE, NEW YORK.

MULTIPLE-NEEDLE OVEREDGE-STITCH-FORMING MECHANISM.

1,083,967. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed June 7, 1909. Serial No. 500,732.

To all whom it may concern:

Be it known that we, JOHN P. WEIS and CARL E. JOHNSON, citizens of the United States, residing in Nyack, county of Rockland, and State of New York, have invented a new and useful Improvement in Multiple-Needle Overedge-Stitch-Forming Mechanism, of which the following is a description.

This invention relates to sewing machines and has particular reference to overedge stitch-forming mechanism of the multiple-needle type.

Among the objects of our invention may be noted the following: to provide a stitch-forming mechanism employing a plurality of needles, in combination with a single looper and a single spreader for the purpose of making a substantial overedge stitch, for edge-covering and selvage-producing purposes, wherein the looper and spreader are actuated from independent trains of mechanism and are given positive movements throughout their operation; to provide an overedge stitching mechanism including a plurality of needles, a looper and a spreader, wherein the actuating mechanism for the looper and spreader are driven by independent trains of mechanism including gears driven from the main driving or power shaft; to provide a stitch-forming mechanism of the type above indicated, wherein the looper is driven from the forward end of the power-shaft and the spreader is driven from the rear end of the power-shaft, whereby the difficulty in manipulating the looper and spreader threads is overcome by enabling the same to be placed under perfect control without interfering with each other, or with the looper and spreader mechanisms; and to provide a simple, compact and high-speed multiple-needle sewing machine, wherein all the parts will be positive in operation and devoid of lost motion.

With the above objects in view, and others which will be detailed during the course of this description, our invention consists in the parts, features, elements, and combinations of elements and mechanisms as hereinafter described and claimed.

In order that our invention may be clearly understood, drawings are provided wherein:

Figure 1 is a front elevation of the well-known Metropolitan sewing machine with our invention applied thereto; Fig. 2 is a view similar to Fig. 1, with the cloth-plate and trimming mechanism removed therefrom for the purpose of better showing the looper and spreader mechanisms; Fig. 3 is a top-plan view of the mechanism located below the cloth-plate of the machine, with the bed-plate shown in outline and the overhanging-arm and trimming mechanism removed; Fig. 4 is a perspective view of the throat-plate used in our machine; Fig. 5 is a perspective view of the presser-foot used in our machine; Fig. 6 is a rear elevation of the take-up mechanism, showing also a portion of the bed-plate in section to illustrate the manner in which said take-up mechanism is attached, the driving-shaft also being shown in section; Fig. 7 is a rear elevation of the looper and spreader mechanisms, the adjacent frame being dotted in simply to show the location of the parts in the machine, and the driving-shaft being broken off; Fig. 8 is a detail view of the looper actuating mechanism; Fig. 9 is an elevation of the eccentric journal pin of the looper; Fig. 10 is a top-plan of the stitch produced by the machine; Fig. 11 is a bottom-plan of the stitch; Fig. 12 is a longitudinal section on the line 12—12 of Fig. 11; and Fig. 13 is a perspective view of the fabric and stitch.

Referring to the drawings, the numeral 1 indicates the bed-plate of the machine, 2 the cloth-plate thereof with the usual depending webs 2^a and 2^b, 3 the overhanging-arm carrying at its forward end the head 4 with its several bearings for the needle-bar 5 and presser-bar 6, the needle-bar carrying at its lower end three needles 5^a, 5^b and 5^c, and being actuated by the needle-lever 7, through the medium of the link 8, pivotally connected to the forward end of said lever and likewise connected to a collar 9, clamped upon the needle-bar, said lever being fulcrumed at 10 upon the vertical portion of the overhanging-arm, and having its rearwardly extending arm 11 pivotally connected to the upper end of pitman 12, which, at its lower end, is provided with the strap 13, surrounding the eccentric 14 on the driving-shaft 15, which is actuated in usual manner by the hand-wheel and pulley 16. As shown in Fig. 3, the driving-shaft is journaled in the lower end of the vertical portion of the overhanging-arm 3 at its rear end and at its forward end is journaled in the standard or bearing-portion 17, usu-

ally formed as a part of the bed-plate 1. The upper end of the vertical portion of the overhanging-arm is provided with a plate 18, suitably secured thereto, carrying the several tension-devices 19, through which the several needle-threads *a*, *b* and *c* are guided after leaving their supply-spools. After leaving the tension-devices, the several threads are led through a guide 20, vertically adjustable by means of slot 21, in said guide, and screw 22 passing through said slot and tapped into the overhanging-arm, said threads next passing to the thread-guide 23, carried by the needle-lever and thence to the usual thread-guide and take-up 24, carried on the upper end of the needle-bar 5. The needle-thread *a* then passes to a guiding-device 25 and from thence downwardly to the outer needle 5^a. The thread *b* passes from the guide 24 downwardly to the middle needle 5^b, and the thread *c* passes from said guide 24 downwardly to the inner needle 5^c. The pitman 12 and eccentric 14 are entirely covered by means of a hood or shield 26, which is secured in place by means of screws 27, which pass through key-hole slots 28, in said hood, and are tapped into the vertical portion of the overhanging-arm of the machine, the said hood shielding the parts referred to and the joint between the arm 11 and the pitman 12 from dust and also preventing the oil from flying and soiling the work.

The cloth-plate 2 has set therein the throat-plate 29, see Fig. 4, which is provided with the feed-slot 30 and parallel therewith, at its forward end, the feed-slot 31, and parallel therewith, at its rear end, the feed-slot 32. In its inner end, said throat-plate is provided with the cut-out portion 33 for the reception of the trimmer-blades carried by the trimmer mechanism, all the parts of which are indicated, generally, by 34, this trimmer mechanism being the invention of John P. Weis, Serial No. 279,116, filed September 19, 1905. The throat-plate, in rear of the trimmer-slot is provided with the several tongues 35, over which the stitches are formed and from which they slip during the feed of the work. The slots 30, 31 and 32, arranged as shown in Fig. 4, provide the central bar 36, the bottom of which is serrated, as shown at 37, said serrations extending substantially in reverse direction to the line of feed and being for a purpose which will be presently explained. The throat-plate is secured in place on the cloth-plate by screws, which may be passed through the apertures 38 and tapped into the cloth-plate in usual manner.

The presser-bar 6 carries at its lower end the presser-foot 39, one side of which is provided with the vertically-extending attaching-plate 40 and the opposite side of which is provided with the tongue 41, over which the spreader-thread is cast and from which the loops formed in the spreader-thread slip during the feed of the work. Between the body-portion 39 and the said tongue 41 is formed a recess 42, within which the needles reciprocate; and the toe 43 of the presser-foot, at one side, supports the shield 44, which shields the fingers of the operator from the trimming mechanism. This shield 44 is secured to the toe of the presser-foot by means of the screw 45, and the tongue 41 may also be secured to the presser-foot by means of the screw 46, passing through the shank 41^a and tapped into the foot.

The feeding mechanism shown in Fig. 3 consists of a crank, carried on the extreme outer end of the power-shaft 15, said crank being encircled by the end 48 of the pitman 49, connected pivotally to the upper end of the rocking-frame 50, journaled as usual on the bed-plate on the journal-pin 51, having its bearings in parallel lugs 52 of said bed-plate. The main feed-bar 53 is journaled upon a stud 54, carried by the upper end of the rocking-frame 50, said bar supporting, at its forward end, the double feed-dog, one portion 55 of which operates through the slot 32 of the throat-plate and the other portion 56 of which operates through the rear end of the slot 30 of the throat-plate, the rear end of the bar 36 of said throat-plate thus entering the slot between the two said feed-dogs. The auxiliary feed-dog, which is arranged in alinement with the main feed-dog and in front of the latter, is supported so as to have its rise and fall with the main feed-bar through the medium of the eccentric 57, carried by the driving-shaft, and to have longitudinal movement. This feed-dog consists of the part 58, which works through the forward end of the slot 30 of the throat-plate and the part 59, which works through the slot 31 in said throat-plate, these two parts 58 and 59 of the feed-dog being separated so that the forward end of the bar 36 of the throat-plate may operate in a space between the two. A longitudinal movement is given to the auxiliary feed-dog through the medium of the link 60, pivoted at its rear end to the auxiliary feed-bar 61, and at its front end to the lever 62, pivoted at its lower end at 63, to the bed-plate of the machine and having an adjustable connection with a pitman 64, the rear end of which is provided with a strap 65, surrounding an adjustable crank on the forward end of the main shaft, the movement of adjustment of the forward end of said pitman 64 being regulated and limited by two adjustable stops 66, slidable in a part 67, fixed to the forward end of the bed-plate at 68. The details of this feed mechanism are not herein more particularly

shown, since they are, or may be, substantially the same as that shown in the application of John P. Weis, Serial No. 330,959, filed August 17, 1906.

Viewing now Figs. 2 and 3, the looper mechanism consists of the bracket 69, secured in any suitable manner to the forward end of the bed-plate and provided with journal-bearings 70, in which is fulcrumed a looper-carrier 71, having secured to its upper end the shank 72 of a thread-carrying looper 73, which coöperates with all the needles so as to simultaneously engage the loops of the threads thrown out by said needles and concatenate its thread with said needle-threads in coöperation with the spreader, as presently described. As shown in Fig. 2, the several needles,—shown as three in number,—are arranged in staggered relation with the right-hand needle extending lower than the middle needle, and the latter extending lower than the left-hand needle, this being for the purpose, as is well understood, of giving the looper ample time to engage all the needle-loops during the retrograding movement of the needles in throwing out their loops. The looper has its loop-engaging toe pointing toward the spreader and the rear end of the machine and, consequently, takes the needle-loops in its movement from left to right. The looper-carrier 71 has pivotally connected to it one end of a link 74, the connection being made by the adjustable eccentric-pin, see Figs. 8 and 9, one portion 74^x of which is set in the upper end of the looper-carrier 71, and the other portion 74^a of which supports the looper-shank 72 and has the link 74 connected thereto. The screw 74^b tapped through the top of the carrier 71 impinges upon the portion 74^x of the pin so as to hold the adjustment made, the pin being provided at its front end with a slot 74^c for the reception of a screw-driver. This connection enables the looper to be adjusted so as to regulate its throw, or oscillating movement, relatively to the needles, so that the nose of said looper may be caused to pass to the right or left of the needles a greater or less distance. The opposite end of the link 74 is connected to a crank-pin 75, carried by a bevel-gear 76, rotating upon a stud or screw 77, set or tapped into the standard 17 of the bed-plate, said bevel-gear 76 meshing with the bevel-gear 78, fixed by a collar 79 to the forward end of the driving-shaft 15, said shaft, in consequence, through the bevel-gearing and the link connection therefrom to the looper-carrier 71, imparting to the looper oscillatory movements in a single plane below the cloth plate.

The spreader mechanism consists of the frame 80, having the forward bearing 81, for the pivotal support of a link or crank 82, which, at its upper end, has pivotally secured to it at 83, substantially midway between its ends, the spreader-carrier 84, the forward end of which has clamped therein, in any usual way, the thread-carrying spreader 85, which coöperates with the looper in forming the multi-thread overedge stitch. The spreader and spreader-carrier are supported by the link 82, so as to be laterally inclined relatively to the looper and the needles, the object being to enable the spreader to engage the several needle-threads on the rear side of the looper,—the latter operating on the rear side of the needles,—and carry said several threads in loop form with a looper-thread loop therein over the edge of the throat-plate and the work thereon, and pass into a position in front of the needles, where the latter, in their next descent, may pass through a loop of the spreader-thread so that the latter will encircle the loops of needle-thread on the top surface of the work. The rear end of the spreader-carrier is pivotally connected to the lower end of one arm 86 of a rocking-frame journaled at 87 in the upper part of the bracket 80, having its parallel arm 88, at its lower end, pivotally connected to the front end 89 of a link, the rear end of which is connected to the crank 90, carried by the bevel-gear 91, journaled upon a stud or screw set or tapped into the vertical portion of the overhanging-arm of the machine near its base, said bevel-gear 91 meshing with the bevel-gear 92, fixed by its collar 93 to the driving-shaft 15. On account of the inclination of the looper-carrier and its support, the rocking-frame 86—88 is also arranged at an inclination while the bevel-gear 91 is arranged in a vertical plane. Owing to this difference in, and relative arrangement of, the said bevel-gear 91 and the said rocking-frame and looper-carrier, there must be a certain amount of flexibility in the connection between said gear and rocking-frame, and this is provided for by making the link connection between the two in two parts 89 and 89^a, connected by the spring or flexible piece 89^b, riveted or otherwise firmly secured at its opposite ends to the adjacent ends of the parts 89 and 89^a of the link. By intervening this spring in the manner shown, the connection between the bevel-gear 91 and rocking-frame is made flexible, or allowed to have torsional or twisting action, to compensate for the obliquity of arrangement of the spreader-carrier and rocking-frame, as will be readily understood. By the proper setting of the parts, or proper timing, the spreader and looper will be caused to coöperate at the extreme of the right-hand movement of the looper so that the spreader may take from the looper a loop of looper thread and carry

the same across the edge of the work and pass its thread thereinto, so as to encircle the needle-threads on the next descent of the needle, as will be understood upon reference to Figs. 10 to 13 of the drawings.

The spreader-thread *s* and looper-thread *l* are led from cops or reels through suitable guides to the machine, and each is under control of a pull-off consisting of the guide-arms 94, for the looper-thread, between which operates a pull-off finger 95, carried by the rock-shaft 96, having a crank 97 at its opposite end, actuated by the pitman 98, carrying the strap 99, surrounding an eccentric secured to the driving-shaft 15 by the collar 100. The spreader-thread is under control of a similar pair of guide-arms 101 and a pull-off arm 102, carried by the shaft 103, actuated, at its opposite end, by the yoke 104, the forward forked end of which embraces the eccentric 105, fixed upon the driving-shaft 15 in any suitable way. The shaft 103 also carries an arm 106, which presses a spring 107, which, in turn, presses a spring 108 attached to the frame of the machine at that point, thus causing the said springs 107 and 108 to clamp, respectively the looper and spreader threads simultaneously with the movement of the pull-off arms upon said threads, said springs releasing and clamping the threads intermittently, as will be readily understood. From the thread-clamp, the spreader-thread passes directly to the spreader, while the looper-thread passes to a take-up shown in Figs. 3 and 6, said looper-thread first passing through the guide-eye 109 and thence across the take-up cam 110 to the guide-eye 111, on the opposite side of said cam, said cam being formed of a grooved member, fixed upon the shaft, in the groove of which operates the shedder-finger 112. The cam 110 is given quite an eccentric prolongation 113, for the purpose of lifting the thread for take-up purposes between the two guide-eyes 109 and 111, said cam depositing the thread upon the shedder-finger 112, which prevents the thread from being carried or twisted around the driving-shaft. The guide-eyes and shedder-finger are carried by the bracket 114, bolted to the bottom of the bed-plate at 115, the guide-eyes being pivoted at 116 to opposite sides of the said bracket 114, and each being adjustable longitudinally in its journal-sleeve by means of the screws 117. The two guide-eyes are held in their horizontal position by means of a spring 118, bearing against the rear end of one of the bars of said eyes and fixed at its lower end in the bed of the machine and controlled by a screw or plug 119, substantially midway its length. The shedder-finger 112 is longitudinally adjustable in the projection 120, by means of the screw 121, tapped into the top thereof and bearing against said finger. The looper-thread, after passing the take-up mechanism, is carried to the front of the machine and passed through a guide, and from thence to the rear end of the looper and threaded through the same in any usual manner. The guide consists of the shank-portion 122, clamped by means of the screw 123 to any suitable portion of the frame of the machine, said guide being in the form of a wire or bar, which is bent forwardly into substantially U-form and then recurved upon itself to provide the thread-guiding loop 124, through which the thread passes, said loop having the rearwardly-extending horizontal arm 125. The said arm extends to an aperture in the depending web-portion 2^b of the work-plate of the machine, said aperture being indicated by 126, Fig. 1. The spreader is threaded, and the looper is threaded; after the take-up has been threaded, through the work-plate by inserting a small, hooked implement through the aperture 126 in the web 2^b up to the opening in the work-plate beside the throat-plate, through which the take-up and spreader are threaded, at which point the hooked implement engages the looper-thread, one end of which is held by the operator and drawn downwardly until the thread is brought in such position that it may be cast over the rearwardly-extending arm 125 of the thread-guide, whereupon it is allowed to slip into the curved portion of said guide, as shown in Fig. 2. The end of the thread is then threaded through the looper.

From the foregoing description, it will be readily understood that, when motion is imparted to the driving-shaft in any usual way, the needle-lever 7 will actuate the needle-bar and the driving-shaft will actuate the looper and spreader, as previously described, the timing of the several parts being such that the needles will descend while the looper is being moved toward the outer end of the machine and the spreader is being moved backwardly in the opposite direction. After the needles have penetrated the work and have retrograded to throw out their loops, the looper will start forward, engage the needle-thread loops, and, pass into the same substantially at its forward extreme of movement, or toward the rear end of the machine, the spreader will coöperate therewith to take a loop of thread therefrom and carry it in loop-form across the edge of the work. Having done this, the spreader will retain said loop upon its body-portion and pass thereinto over the top surface of the work, and present its thread in such position that the needles, on their next descent, will pass through a loop of said spreader-thread extending from a previously formed stitch back of the needles around the outside thereof to the point of the spreader and back

along the body of the spreader to its supply. The feed takes place in proper timing after the needles have risen from the work so that, by the movement of the work, the strands of the several loops of looper and spreader-thread, and which extend over the tongue 41 on the presser-foot, will be spread out laterally over the edge of the work, thus very effectively covering the same. The tension and take-up devices will operate to draw the needle, looper and spreader threads into proper position so as to retain the junction of the looper and spreader-thread loops on the edge of the work with the spreader-thread passing therethrough and around the needle-thread loops on the top surface of the work, and the looper-thread passing through said needle-thread loops on the bottom surface of the work and there retain the same, the said looper-thread thus connecting the series of needle-loops on the bottom and the spreader connecting the series of needle-loops on the top surfaces of the work. The take-up and pull-off, operating on opposite sides of the thread-clamps, will perform their respective functions of drawing down a supply of both threads and take up the slack in the looper-thread, while the thread is clamped, both the take-up and pull-offs maintaining a yielding control of the threads after the thread-clamps have released the same so as to give up the threads to the looper and spreader at the proper time. The bevel-gear mechanisms for operating the looper and spreader derive all their movements directly from the driving or power shaft, as the prime mover, and being totally independent trains of mechanism from said power-shaft run, respectively, to said looper and spreader and operate the same in proper timing in the manner described. The mechanisms of the looper and spreader are not, in consequence, dependent upon each other, except in causing the manipulation of the several threads to produce the overedge stitch, and the trains of mechanism are entirely independent and the fulcra of the looper and spreader are entirely independent. The movements of both the looper and spreader are positive, direct and speedy, and can be readily timed to accurately coöperate with each other. During the running of the machine, lint often covers the feed-bars and gets down in the groove between the feed-dogs and gradually piles up, this often resulting in packing to such an extent as to bend and break the bar 36 of the throat-plate. To overcome this, the teeth or serrations 37 on the bottom of said bar 36 of the throat-plate have been provided, the same operating to push the lint out of the groove between the feed-dogs during the feeding movement of the feed-bars.

In Figs. 10 to 13 we have illustrated the form of stitch made in accordance with the foregoing description, in said figures the several needle-threads and the looper and the spreader-threads are indicated by the reference characters heretofore used to indicate said threads in the other figures. The pieces of fabric which are stitched together and overedged are indicated by the letters A and B, said pieces of fabric being superposed and the edges being trimmed simultaneously with the stitching and in advance thereof as will be readily understood. The several needle-threads are arranged in parallelism adjacent the edges of the work and the looper and spreader-threads are drawn or held under such tension as to cause their interlocking loops to meet substantially midway between the top and bottom surfaces of the work. This is preferable though by no means necessarily so, since according to the tension applied to either the looper or the spreader-threads, the line of interlock of the loops of the two threads can be caused to run more or less near either of the surfaces of the work as desired, or can be caused to run on either edge of the work so as to produce a beading or finish thereon. Furthermore, the several threads may be of different colors so as to produce effective ornamental overedge stitching having the appearance of embroidery and imparting a nice finish for fine fabrics such as silk, lace, etc.

In our construction, it will be seen that the looper mechanism is held independently of the spreader mechanism. The fulcrum of each having its own support which are independent of each other, having for common support the bed-plate of the machine only. Each of these mechanisms is positively actuated by a mechanism deriving its movement from the driving-shaft by independent bearing, and these mechanisms are of such character, and arrangement of the elements thereof is such as to impart to the looper and spreader respectively direct, positive and speedy movements. By so arranging the mechanism, absolute accuracy and timing can be obtained between the spreader and the looper so as to provide perfect cooperation and make it possible for the several threads to be concatenated precisely as required or desired according to the tension applied to the several threads and take-up action. By making the mechanisms independent and constructing them as described, an ordinary sewing machine of the Metropolitan type can be quickly converted into a multiple-needle over-edge stitch machine, and this with comparatively little expense. The flexible connection in the pitman between the driving-gear and the spreader-carrier, compensates for a large amount of variation in adjustment of the spreader relatively to the looper and needles, without

twisting or straining the driving mechanism, and at the same time provides a direct drive which is positive and strong. By using gears for taking the drive from the power-shaft and transmitting it to the looper and spreader respectvely, high speed can be attained with comparatively little strain upon the parts or vibration of the machine. Therefore, in the claims broad terms will be used to cover said important features of our machine and we desire it understood that limitations are not to be read into the claims unless specifically included.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A stitch-forming mechanism comprising a plurality of needles, a looper, and a spreader, two independent sets of driving-mechanisms,—one for the looper and the other for the spreader,—each set of driving-mechanisms including a pair of bevel-gears, a pitman connected thereto and to the said stitch-forming elements.

2. A stitch-forming mechanism comprising a plurality of thread-carrying elements, two of which are located below the work-plate and arranged coöperatively, means for actuating said elements including a power-shaft common to all said elements, two sets of bevel-gears driven by said shaft, a pitman connection between each set of gears and the respective lower stitch-forming elements, and a lever mechanism connecting the power-shaft with the other stitch-forming element.

3. A stitch-forming mechanism comprising a plurality of needles, a looper coöperating therewith and a spreader coöperating with the looper and the needles, the looper being confined to oscillatory movement below the cloth-plate and the spreader being mounted to coöperate with the looper below the cloth-plate and the needles above the cloth-plate, mechanism for actuating the looper, and an independent mechanism for actuating the spreader, the looper and the spreader actuating mechanism each including a gear and a link connection.

4. A stitch-forming mechanism including a plurality of needles, a looper and a spreader coöperating with all of said needles, and means for guiding the thread to the looper, including a U-shaped device having a free-ended, elongated guiding-bar extending to the end of the machine and a curved thread-guiding slot extending into coöperative relation to the looper.

5. A stitch-forming mechanism having, in combination, a plurality of needles, a looper and a spreader, a bracket carrying the looper, an independent bracket carrying the spreader, means for actuating the looper and spreader, the spreader-actuating means including a pitman composed of two parts with a flexible connection between them.

6. A stitch-forming mechanism comprising a plurality of needles, a looper and a spreader, means for actuating the looper and spreader, including a system of gears, and a connection between one of the gears and the spreader, including a rocking-frame, a flexible link and a pivotal support for the spreader.

7. A stitch-forming mechanism having, in combination, a plurality of needles, a looper coöperating with said needles, a spreader coöperating with said looper and said needles, a crank mechanism for actuating the looper, an independent crank mechanism for actuating the spreader, a link connection to the spreader from its crank mechanism including a flexible section, and a link connection from the looper to its crank mechanism.

In testimony whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JOHN P. WEIS.
CARL E. JOHNSON.

Witnesses:
OSCAR DEVOE,
FRITZ BENDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."