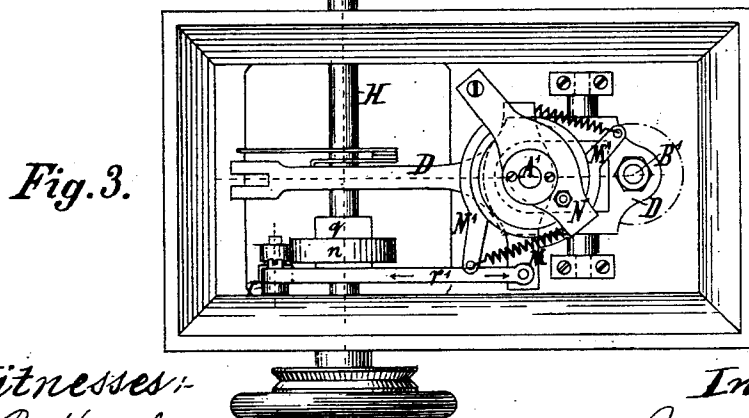
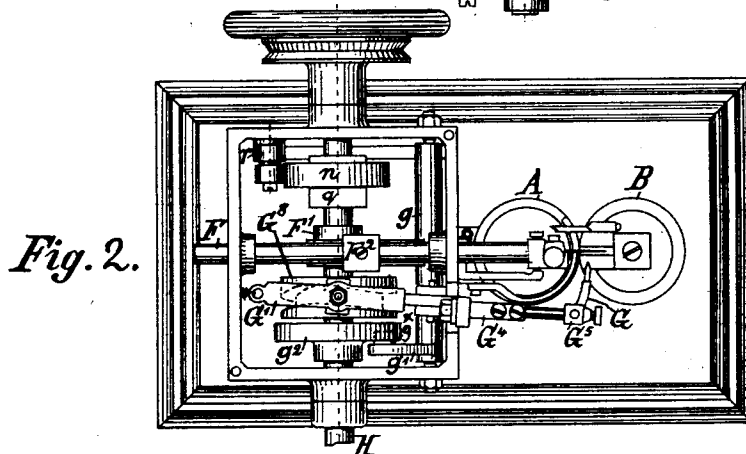
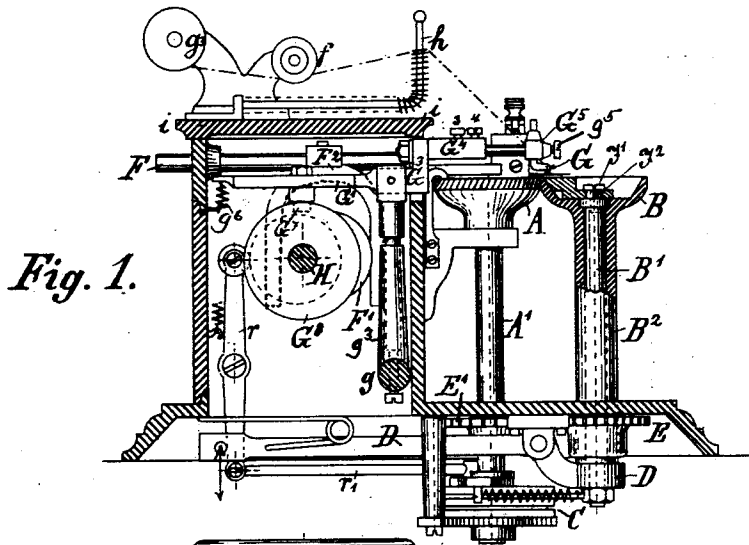


J. KÖHLER.
MACHINE FOR SEWING LOOPED FABRICS.

No. 520,208.

Patented May 22, 1894.



Witnesses:
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H. W. Walker

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att'y.

(No Model.)

5 Sheets—Sheet 2.

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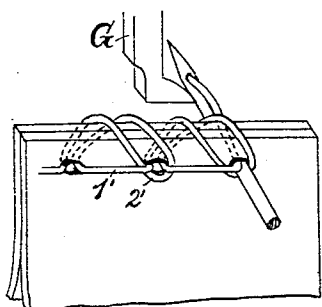


Fig. 4.

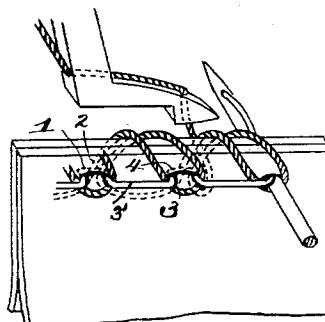


Fig. 5.

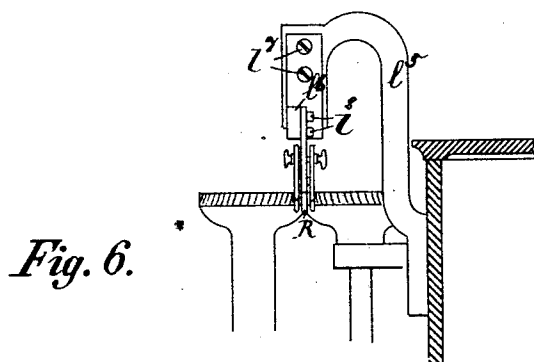


Fig. 6.

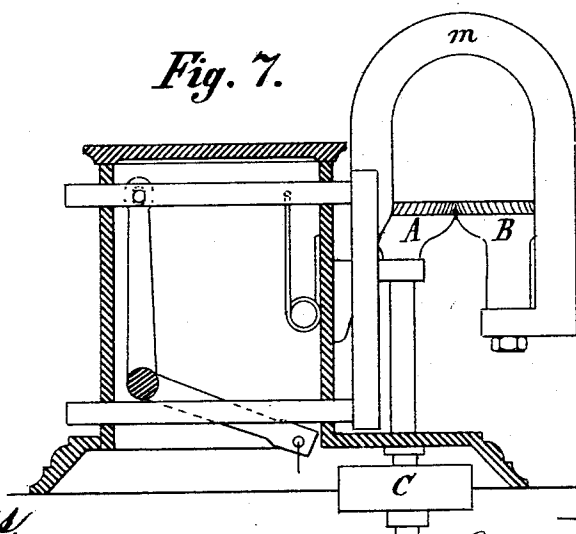


Fig. 7.

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(No Model.)

5 Sheets—Sheet 3.

J. KÖHLER.
MACHINE FOR SEWING LOOPED FABRICS.

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Patented May 22, 1894.

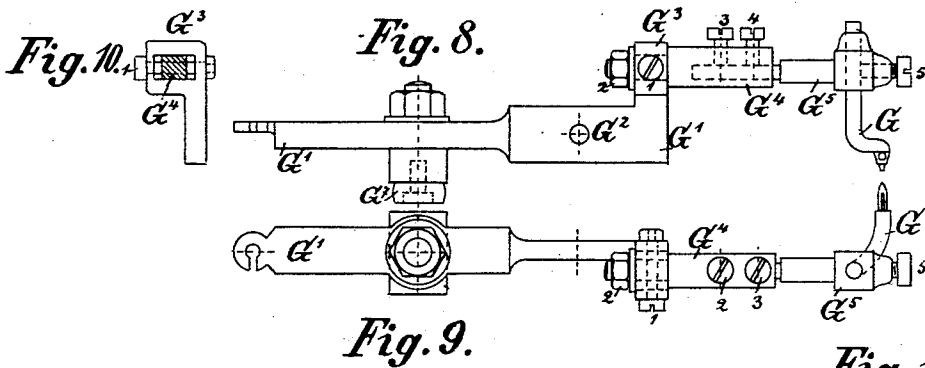


Fig. 12.

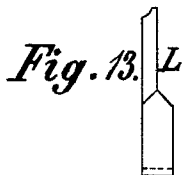
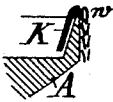


Fig. 11.

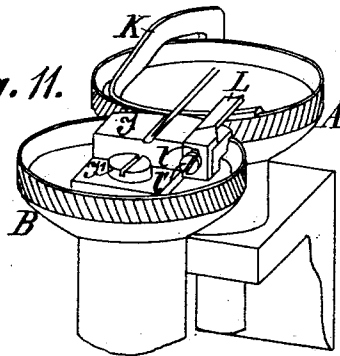


Fig. 14.

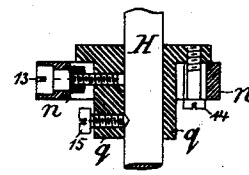
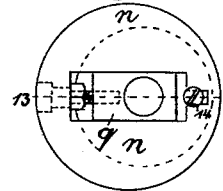


Fig. 15.

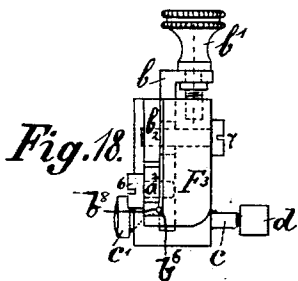


Fig. 16.

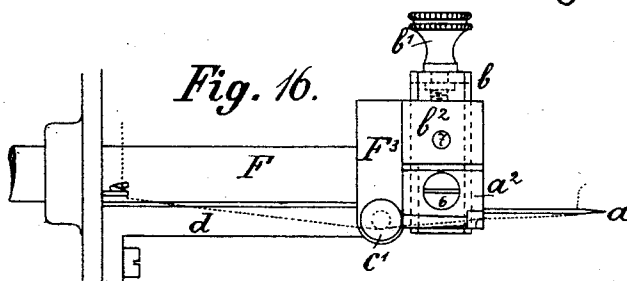
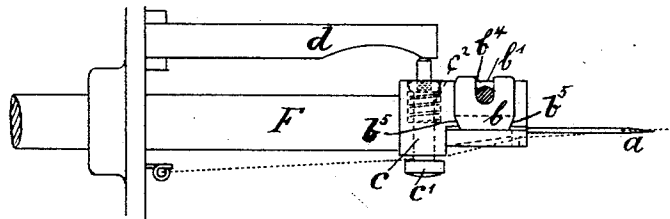


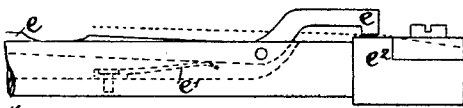
Fig. 17.



Witnesses

N.B. Kingsberg
H. Walker

Fig. 19.



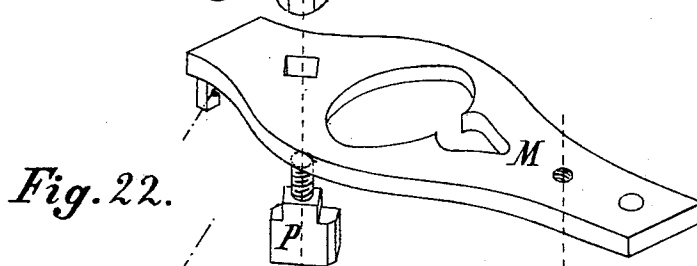
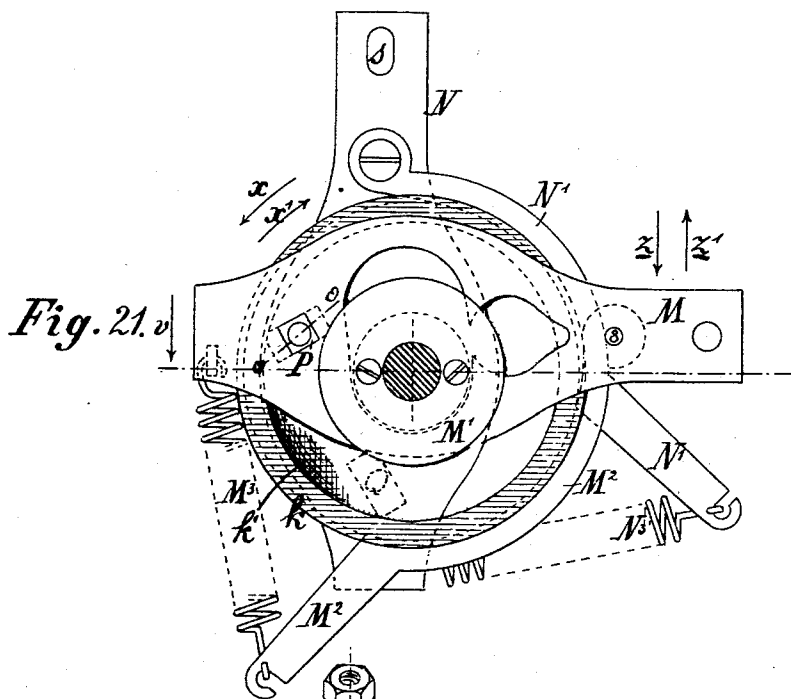
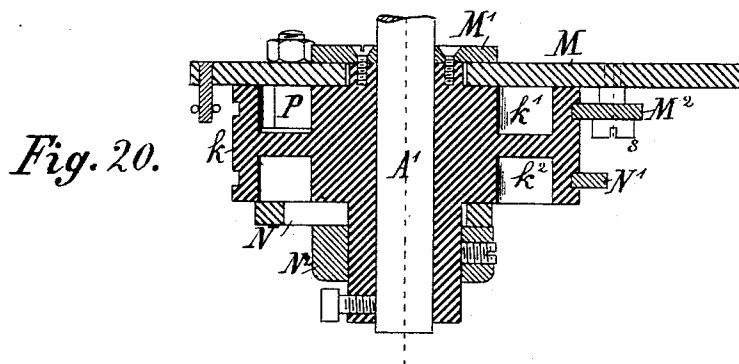
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MACHINE FOR SEWING LOOPED FABRICS.

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MACHINE FOR SEWING LOOPED FABRICS.

No. 520,208.

Patented May 22, 1894.

Fig. 23.

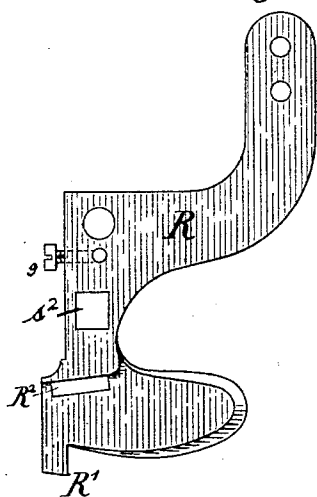


Fig. 24 Fig. 25. Fig. 26

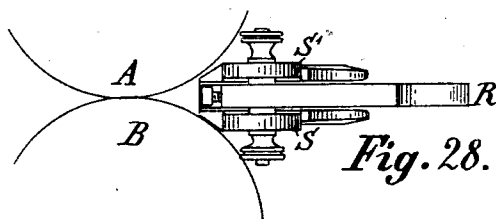
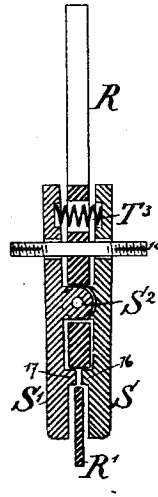
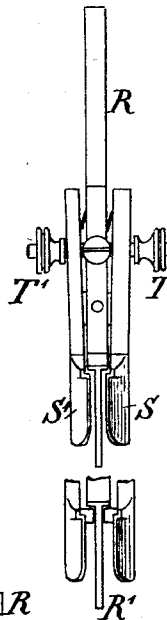
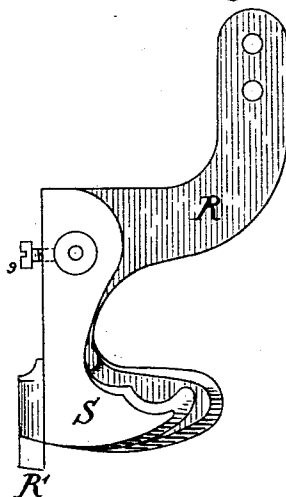


Fig. 27.

Fig. 28.

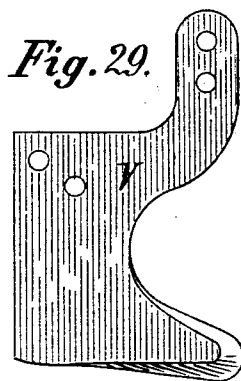


Fig. 30.

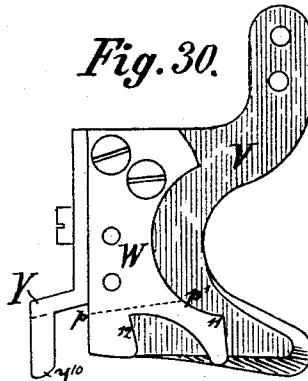


Fig. 31.

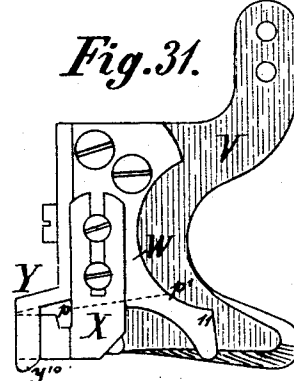


Fig. 32.

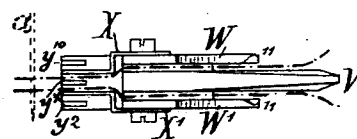
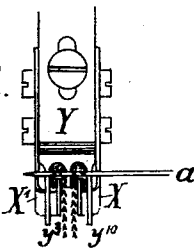


Fig. 33. Inventor:

Witnesses:

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H. E. Walker

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UNITED STATES PATENT OFFICE.

JULIUS KÖHLER, OF LIMBACH, GERMANY.

MACHINE FOR SEWING LOOPED FABRICS.

SPECIFICATION forming part of Letters Patent No. 520,208, dated May 22, 1894.

Application filed September 9, 1890. Serial No. 364,405. (No model.) Patented in England December 29, 1888, No. 18,975, March 16, 1889, No. 4,576, July 27, 1889, No. 11,947, and August 14, 1889, No. 12,814; in France January 28, 1889, No. 195,664, April 11, 1889, No. 197,382, and August 17, 1889, No. 200,238; in Germany July 27, 1889, No. 51,145, and in Spain February 16, 1891, No. 11,637.

To all whom it may concern:

Be it known that I, JULIUS KÖHLER, a subject of the Emperor of Germany, residing at Limbach, Saxony, in the German Empire, have
5 invented certain new and useful Improvements in Machines for Sewing Together the Edges of Knitted and Similar Fabrics, (for which Letters Patent have been obtained in Germany, No. 51,145, dated July 27, 1889; in
10 England, No. 18,975, dated December 29, 1888, No. 4,576, dated March 16, 1889, No. 11,947, dated July 27, 1889, and No. 12,814, dated August 14, 1889; in France, No. 195,664, dated
15 January 28, 1889, No. 197,382, dated April 11, 1889, and No. 200,238, dated August 17, 1889, and in Spain, No. 11,637, dated February 16, 1891,) of which the following is a specification.

The object of this invention is materially to increase the precision and speed of operation and consequently the general working capacity of "overcast" sewing machines, to allow of the ready adjustment of its various parts, and lastly to make the machine stronger and more durable than similar machines have
25 proved to be hitherto.

The arrangement of my improved machine is illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical longitudinal section; Fig. 2 a plan with the cover or top plate removed, and Fig. 3 a bottom plan view. Figs. 4 and 5 are detail perspective views illustrating the manner of forming seams with one and two threads respectively. Fig. 6 is a sectional elevation showing the manner of attaching the fabric-guide to the machine. Fig. 7 is a like view showing a machine in which the feed roller B is differently supported. Fig. 8 is a detail elevation of the looper and holder and levers or arms connected therewith. Fig. 9 is a plan view of said parts. Fig. 10 is a detail sectional elevation showing the connection between the levers or arms G' and G⁴. Fig. 11 is a perspective view of the feed rollers and adjacent parts hereinafter referred to. Fig. 12 is a sectional view of a portion of one feed roller and web K. Fig. 13 is a plan view of the rail L. Figs. 14 and 15 are a plan and a vertical section hereinafter referred to.
50 Figs. 16, 17, and 18 are respectively a side, a plan

and a front view illustrating the adjustable needle and thread clamping devices. Fig. 19 is a side view illustrating an ordinary thread-clamping device. Fig. 20 is a vertical section of the feeding devices and Fig. 21 a plan
55 view thereof. Fig. 22 is a perspective view of parts of the feeding device detached. Fig. 23 is a side view of the main portion of the guide for the fabric provided with a selvage; Fig. 24 a like view of the guide complete; 60 Fig. 25 a front view of Fig. 24; Fig. 26 a cross section; Fig. 27 an elevation of the lower part of the guide; Fig. 28 a plan view of the complete device; Fig. 29 a side view of the main part of another guide which I contemplate
65 using for fabrics not provided with a selvage. Fig. 30 is a like view showing the part V of the guide provided with the parts W and Y. Fig. 31 is a side view of the complete device; Fig. 32 a front view thereof, and Fig. 33 a plan
70 view.

The fabric is fed to the horizontally movable stitching needle by the two feed wheels or rollers A and B, to which the feeding mechanism (presently to be fully described) imparts
75 such a periodical or "step-by-step" motion that each succeeding mesh or loop of the edge of the fabric is engaged in turn by the needle. The shaft B' of the feed roller B (Figs. 1 and 3) has firmly attached to it the shorter
80 arm of the lever D which is operated by the user of the machine, through the medium of a pedal, (not shown) in such a manner that one feed roller B recedes from the other A so that the goods may be inserted between the
85 two. The feed roller B, Fig. 1, together with its long sleeve or tubular shaft B² rotates upon the fixed shaft B', the said tubular shaft B² being geared, by means of toothed wheels E and E' to the shaft A'.
90

The needle bar F is set in motion in the ordinary way by means of an eccentric F' and a fork or yoke F².

The looper G is adapted to receive a three-fold motion, viz., in the directions of the needle, transversely to the needle, and up and down. For the purpose of imparting motion to the looper transversely to the needle, the same is adjustably secured within a holder G⁵ by means of a set-screw g⁵, said holder be-
95
100

ing secured to an arm G^4 which is in turn secured to an arm G^7 , the latter being provided with a roller G^7 which rides in a cam-groove formed in the disk G^8 mounted on the shaft H. The movement of the looper in the direction of the needle is obtained by means of the arm g' secured to the shaft g , said arm g' being provided with a pin or stud g^x which rides in a cam-groove formed in the face of the disk g^2 also mounted on shaft H. The arm G^7 as will be seen is pivoted as at G^2 to the upper end of the arm g^3 carried by the shaft g . The third or up and down movement of the looper is but of a very limited extent and consists in a slight rising motion produced by the bottom of the groove in the disk G^8 acting upon roller G^7 the arm G^7 having for the purpose secured thereto one end of a spring g^6 which is secured at its opposite end to the housing of the machine.

This sewing machine is adapted to operate with either one or two threads—in the former case thread being supplied to the needle only, and in the latter case to the needle and looper. The manner of producing a seam with one thread is illustrated in Fig. 4 in which only the needle is provided with a thread. In the formation of the seam, the needle enters the fabrics and its thread is engaged by the looper on its forward movement and during this engagement the needle is withdrawn from the fabrics while at the same time the looper moves along and carries the needle thread over the edges of the fabrics and the latter being fed along the portion 1' of the needle thread will be laid along the face of the fabric and the needle on its next forward movement passes through the loop 2' which has been freed by the looper and then through the fabrics again, the thread of the needle being again engaged by the looper on its next forward movement and the described operation repeated for the next stitch and so on. A seam so formed requires but a short length of thread by pulling which however it can easily be destroyed. This drawback is avoided in the overcast seam obtained by means of two threads, as illustrated in Fig. 5. The looper and the needle are in this case each provided with a thread, but it is not the loop formed by the thread of the needle but the looper thread, which here takes up its position around the needle.

In Fig. 5 after the needle has entered the fabrics, the loop 1, formed by said needle upon its backward movement is entered by the looper on its forward movement which carries its thread 2 through the loop formed by the needle and said looper then raises its own thread over the edges of the fabrics after which the fabrics are fed along whereby the portion 3' of the needle thread will be laid along the face of the fabric. The looper then upon its backward movement forms the loop 3 which is then entered by the needle after which a second loop 4 is formed by said needle on its next backward movement, which

loop 4 is entered by the looper on its next forward movement and so on until the fabrics are sewed together.

The manner of operating the looper and the needle is the same for both kinds of seam so that all that is necessary to change the nature of the seam, is to replace the looper. Thread is supplied from the spool g^9 Fig. 1 being passed over or through the drag or tension device f and the catch-spring h previous to reaching the looper and needle respectively. In one end G^3 of this lever G^7 which end is an angular extension, is provided a slot into which is inserted the arm G^4 . By means of the screw 1 this piece may be adjusted laterally and it may be firmly secured in the adjusted position by means of the nut 2. The holder G^5 of the looper is provided with a shank which may be moved backward and forward within an opening provided for the purpose in the piece G^4 and is secured in the adjusted position by screws 3 and 4. The looper itself is capable of upward and downward adjustment within the head of the said holder G^5 and may be secured in its adjusted position by means of the screw 5. It will thus be seen that by this arrangement the looper can be readily adjusted horizontally in two different directions and also vertically.

For the purpose of retaining the needle in position during its operation and insure the formation of a proper loop on the upper side the needle is embedded in and guided by a groove provided in the needle block Fig. 11. This block has been hitherto retained upon the flat end of the shaft or pivot on which the front feed roller B rotates by means of a screw y' only, so that it frequently happened that the block itself y turned a little way out of its position and that the point of the needle struck against it in consequence and broke off. In this improved machine the shaft B' Fig. 1, is provided at its upper end with a square projection y^2 upon which the needle-block is firmly secured being held in place by the screw y' .

Considering the fact that it is impossible in using feeding apparatus such as have been hitherto constructed, to carry forward the work sufficiently far for the needle to reach the unwound portion situated behind the feed it has been deemed necessary to provide a special mesh-holder. This consists of a steel web K Fig. 11, extending along the inner wall of the feed roller A and projecting on the right side of the needle, *i. e.*, on the side on which the goods are presented to it, somewhat above the edge of the said roller as is clearly shown in Fig. 12. Owing to this arrangement the last row of meshes w Fig. 12 is carried toward the needle in an erect position along side the needle-block y which similarly to the web K slightly projects above the edge of the feeding roller on one side of the needle.

Up to the present time the means for vertically adjusting the position of the fabric

have consisted merely of a flat steel spring, which was securely screwed onto the needle-block and it was part of the task of the attending operative to set the goods as they were fed along higher or lower as might be required by bending the said spring by hand. To provide a more convenient and certain means for this purpose I provide my machine with a small rail L Figs. 11 and 13, bent at right angles and slotted at its rear portion as at 1. Through this slot is passed a set screw 1' which is adapted to screw into the block y, so that by first loosening the screw and adjusting the rail L to the desired height and then tightening the screw said rail will be firmly held in the position desired. Thus the fabric which is fed along beneath the rail L will be prevented from rising higher than the same, so, it will be seen that the rail determines at all times the height to which the fabric is permitted to rise.

A most important desideratum in overcast-stitch sewing machines is that the needle should at all times move immediately above the feed roller. The consequence is that when it is desired for example to substitute a coarser needle for a finer one the former owing to its greater thickness must be arranged somewhat higher than the latter. To provide for such differences of level the needle-bar head is provided with the arrangement shown in Figs. 16, 17 and 18. A slide b, dovetailed or beveled as at b⁵ (see Fig. 17) is provided with a vertical groove b⁴ in which works a threaded thumb-screw or rod b' whose lower end bears upon the needle-bar head, so that by turning the rod b', the slide b may be raised or lowered as desired. The lower portion of slide b, is provided at one side with a semi-cylindrical groove b⁶ for the reception of the needle a.

a² indicates a small plate which is provided upon its inner face near its lower edge with a semi-cylindrical groove b⁸ which is adapted in conjunction with the groove b⁶ to firmly clamp the needle in position, and said plate a² is adapted to be adjustably secured to the slide b, by means of a screw 6 which works through the plate and into the needle-bar head. But to securely hold the slide itself in its vertically adjusted position, a second plate b² is provided through which and the needle-bar head works a screw 7 whereby the latter is adapted to hold the plate b² against the slide b. When this plate b² is loosened the slide can be shifted upward or downward, as required, while the needle is firmly retained in place. As soon as the needle begins to recede the further supply of thread thereto should be stopped so that the length of thread paid out by them, may have time to form a loop and to be with certainty entered by the looper. For this purpose it has been the practice hitherto to provide a lever such as e Fig. 19, on one side of the needle-bar within a suitable groove so that it may with its forward end under the action of the

spring e' press upon the needle-bar head and lock or clamp the thread; but in consequence of the thread always passing through the same part between the lever-end and the needle-bar head it eventually became hollowed out and rendered the clamping action of the two devices futile. To remove this inconvenience I provide the head of the needle-bar with a bolt or pin c, terminating in a head c' said bolt or pin c, passing transversely through the needle-bar, and being encircled by a coiled spring c² located in a recess in the needle bar and which by bearing at one end upon the rear wall of the recess and at its opposite end against a shoulder on the bolt or pin causes the head c' to always lie in contact with the needle bar and firmly clamp the thread passing between said parts.

During the motion of the needle-bar the bolt c moves in contact with the cam d firmly secured to the frame of the machine. When the needle-bar begins to move back to the left as in Fig. 17 the said bolt is released and the thread clamped so that the length of thread fed to the needle is enabled to form a loop for the looper to engage in.

In connecting or stitching together fabrics knitted in meshes or loops of uniform size and provided with a stiffened selvage it is desirable that each individual mesh should be connected with a corresponding mesh of the opposite edge and it is therefore a matter of great importance that the goods should be fed to the needle periodically or "step by step" throughout the length of the machine, to accomplish which result it is necessary that the size of the stitches should be adjustable.

The feeding device in this machine is consequently arranged as follows:—Upon the shaft A' of the feed roller A is mounted a disk k provided in its upper and lower surfaces with circular recesses or grooves k' and k² respectively with each of which engages one of the blocks P, Q (Figs. 21 and 22) secured respectively to the arms M and N. The arm M lies upon the disk k and is adjustably retained in position by the plate or collar M' screwed against it. The other arm N is arranged underneath the said disk k and is similarly adjustable by means of the ring or collar N². One end of the arm M is drawn by a spring M³ in the direction of the arrow v while the other end is moved by the driving gear in the direction of the arrow z or z' as the case may be. The spring M³ is secured to the holder or arm M² Figs. 21 and 22 embedded in a peripheral groove in the disk k and pivotally connected to the arm M by means of a screw 8. The said holder or arm M² thus partakes of the motion of the arm M so that as this arm rotates the spring M³ is not extended but continually holds the block P lying in the recess k' of the disk in contact with the side walls of such recess. When the rear or right-hand end of the arm M is moved in the direction of the arrow z the block P is thereby still

more firmly pressed against the side walls of the recess k' containing it, so that the disk must turn in the direction of the arrow x' . This being so, when the arm moves in the direction of the arrow z' the said block is caused to assume a position in which its center line would be as indicated by the dotted line $o o$ in which position it becomes free so that the forward or left-hand end of the said arm M will, under the action of the spring M^3 follow the motion of the holder M^2 without necessitating the expansion of the spring. The block P recedes within the recess or groove k' in the disk k a sufficient distance only to allow of the motion of the arm although the said block constantly remains in contact with the walls of the annular groove so that it can immediately carry it one step farther to assist the production of one stitch. During the backward motion of the arm M in the direction of the arrow z' provision is made to prevent the disk k from revolving backward or getting out of position under the action of the fabric acted upon. For this purpose the arm N at the under side of k is provided with a block Q which is connected with the spring N^3 and a holder or arm N' . The farther end of the arm is provided with a slot s through which passes a screw secured in the frame of the machine. When the feeder is about to turn in the direction of the arrow x the edges of the block Q press firmly against the sides of the groove k^2 and prevent the disk from turning backward but when the latter is turned by the other arm M in the direction of the arrow x' the block Q frees the sides of the recess k^2 in a manner similar to that in which the block P frees the sides of recess k' as hereinabove described, such freeing of the blocks being caused by reason of the arms N, M, being eccentrically mounted on shaft A' as seen in Figs. 20 and 21, with relation to the disk k and grooves therein.

The arm M is operated as shown in Figs. 1 and 3 through the medium of the link r' connected with a lever r the roller of which rests against the eccentric n Figs. 1 and 2. This eccentric is adjustable as shown in Figs. 14 and 15. The sleeve or block q is secured by means of the screw 15 upon the driving shaft H. The eccentric n is passed over this block and the set-screw 13 serves to adjust it while the screw 14 retains it in the adjusted position.

The guide is applicable to fabric provided or unprovided with a selvage. The edge or selvage of knitted fabric tends to roll up of its own accord. The object of the guiding device hereinafter described is therefore both to unroll the edges of such fabrics and to carry them toward the stitching-needle at the desired level.

A guide for fabrics provided with a selvage is illustrated in Figs. 23 to 28. The main part R is provided with a slot R^2 Fig. 23 and a tongue R' . On either side of its main portion are arranged side-pieces or cheeks S S'

beveled at their forward edges so as to enable the guide to approach as near as possible the point of contact of the feed rollers A and B as shown in Fig. 28. Each of these side pieces is adapted to engage by means of a small projection 16 and 17, Fig. 26 in the slot R^2 of the piece R and the cheeks are jointed together as at S^2 Fig. 26, within a slot s^2 of the main part R. A screw 10 carrying the two nuts T' and T^2 enables the said cheeks S and S' to be adjusted so that between the latter and the tongue there remains a space of greater or less width as shown in Figs. 27 and 25 respectively so that finer or coarser fabrics may by the same guide, be conveyed to the feeding rollers. Between the upper portions of the cheeks S S' is inserted a spring T^3 whereby the said cheeks are held against the nuts T' and T^2 by a yielding pressure so that they can be slightly shifted should some parts of the fabric passing the guide be thicker than the rest. The screw nuts T' and T^2 however enable the cheeks S S' to be adjusted in such a manner that the fabric can pass through without pressure.

A guide for fabrics with the selvages cut off is illustrated in Figs. 29 to 33. The main part of this guide is shown in Fig. 29, and the guide is shown complete in Fig. 31 as seen from one side. To the main part V are screwed the side pieces W W'. Down to the part indicated by the dotted line $p p'$ these side pieces abut against the main piece V while lower down they are offset so as to be sufficient distance apart from the latter to enable the fabric to pass between (as shown by the dot and dash lines in Fig. 33). The fabric unrolls at the edge-pieces 11 and 12. Over the side pieces W and W' are secured the plates X and X', the forward edges of which are bent inwardly as shown in Fig. 33 so that they may take up their position between the tongues $y^{10} y^x$ and y^3 formed on the part Y. Owing to the side-pieces W and W', the two edges which it is desired to connect by an over-cast stitch are raised to a somewhat higher level than that provided for by the tongues $y^{10} y^3$, Fig. 32, with the result that the edges of the goods are turned over outwardly and in which condition they are presented to the point of the stitching needle a . According to the position to which the parts Y X and X' are adjusted the fabrics may be thus turned over to a greater or less extent.

The manner in which the guide is attached to the machine is shown in Fig. 6. An overhanging arm l^5 is provided which is secured to the machine, which arm is provided with a projection or bracket l^6 which is vertically adjustable on the arm l^5 , by means of screws l^7 . The guide is secured to the bracket l^6 by means of screws l^8 or the like.

All the improvements herein described are also applicable to machines in which the feed roller B is held by an arm m in a position enabling pieces of fabric of any size to be con-

veyed through the feeding rollers as exemplified in Fig. 7.

I claim—

1. In a sewing machine of the class described, the combination with a horizontally-reciprocating needle, of a looper adapted to cooperate with said needle to form a stitch, the holder G^5 having a vertical opening in which the looper is vertically adjustable, the bar G^4 provided with a horizontal opening in which the holder G^5 is horizontally adjustable, a lever G' provided with a horizontal slot in which slot the bar G^4 is laterally adjustable, a roller on said lever, a revolving shaft, a disk thereon having a cam groove in which rides the said roller, a second disk mounted on said revolving shaft and provided in its face with a cam-groove, a rock shaft provided with arms one of which supports the lever G' and the other being provided with a pin or stud adapted to ride in the cam-groove of said second disk, as and for the purpose specified.

2. In a sewing machine of the class described, the combination with stitch-forming mechanism, of rotatable feed rollers A, B, having sockets or recesses in their upper ends shafts upon which said rollers are mounted, a squared projection y^2 on the shaft B' , a needle-block y , arranged in the recess of roller B and fitted upon said projection, and having an angular portion the upper face whereof lies slightly above the upper edge of said roller, a screw y' securing the needle block to the projection y^2 , and a groove in the upper face of said angular portion of the needle block, as and for the purpose specified.

3. In a sewing machine of the class described, the combination with stitch-forming mechanism of rotatable feed rollers A, B, having sockets or recesses in their upper portions, shafts upon which said rollers are mounted, a squared projection y^2 on the shaft B' , a needle-block y , arranged in the recess of roller B and fitted upon said projection and having an angular portion, the upper face whereof lies slightly above the upper edge of said roller, a screw y' securing the needle block to the projection y^2 , a groove in the upper face of said angular portion of the needle block, an arm K extending along the inner wall of the feed roller A and projecting above the upper edge of the same, all as and for the purposes specified.

4. In a sewing machine of the class described, the combination with stitch-forming

mechanism, of rotatable feed rollers A, B, having sockets or recesses in their upper portions, shafts upon which said rollers are mounted, a squared projection y^2 on the shaft B' , a needle-block y , arranged in the recess of roller B and fitted upon said projection and having an angular portion, the upper face whereof lies slightly above the upper edge of said roller, a screw y' securing the needle-block to the projection y^2 , a groove in the upper face of said angular portion of the needle block, and a rail L arranged above the upper edges of the feed rollers and having a downward extension, a slot in said extension, and a set-screw passing through the said slot and into the needle-block, all as and for the purposes specified.

5. In a sewing machine of the character described, the combination with stitch-forming mechanism, of a feeding mechanism, comprising the feed rollers, rotatable shafts upon which said rollers are mounted, a disk k , mounted on one of said shafts and provided with circular recesses or grooves in its upper and lower surfaces, the arms M and N secured upon the disk, the blocks P and Q respectively carried by said arms and engaging with the grooves or recesses, the arms M^2 and N' pivotally connected at one end to the arms M and N respectively, springs connecting the opposite ends of the arms M^2 N' with the arms M, N, respectively, and means for operating the arm M in the manner and for the purpose specified.

6. In a machine of the character described a fabric guide comprising the piece R provided with a slot and a tongue R' , guide pieces S, S' pivoted together in said slot, an adjusting screw adapted to effect a lateral adjustment of the pieces S, S' , for the purpose specified.

7. In a machine of the character described, the fabric guide comprising the piece R provided with a slot and a tongue R' , guide pieces S, S' , pivoted together in said slot, an adjusting screw adapted to effect the lateral adjustment of the pieces S, S' , and a coiled spring passing through the piece R and bearing upon the pieces S, S' , for the purpose specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JULIUS KÖHLER.

Witnesses:

R. E. JAHN,

WILLIAM R. MATTHES.