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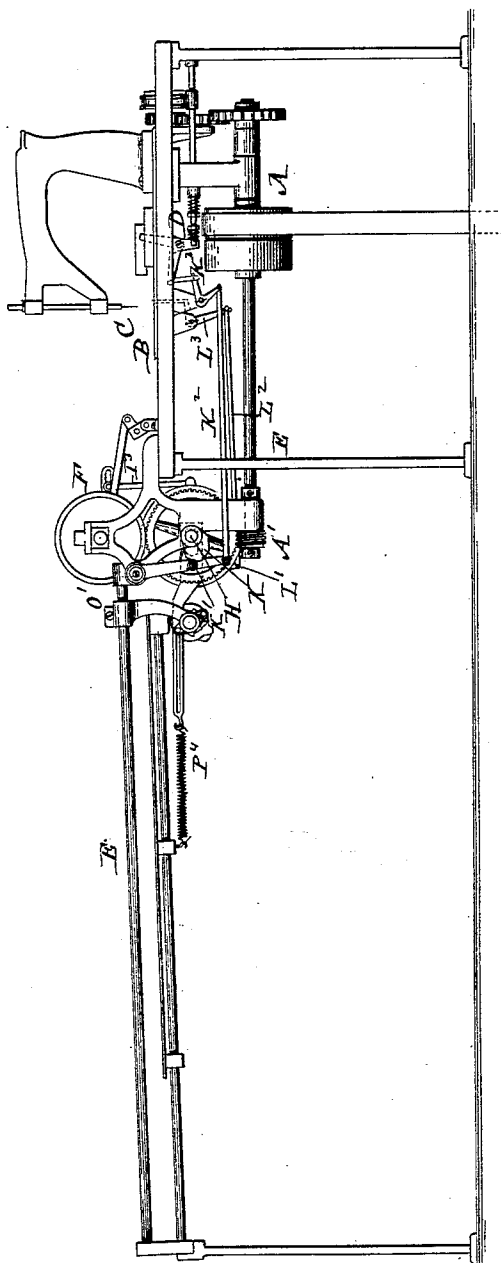
9 Sheets—Sheet 1.

H. E. HAWES.
SEWING MACHINE.

No. 593,577.

Patented Nov. 16, 1897.

Fig. 1.



WITNESSES:

Fred C Ewing
J. R. Paige

Herbert E. Harris INVENTOR

Charles D. Paige
ATTORNEY

(No Model.)

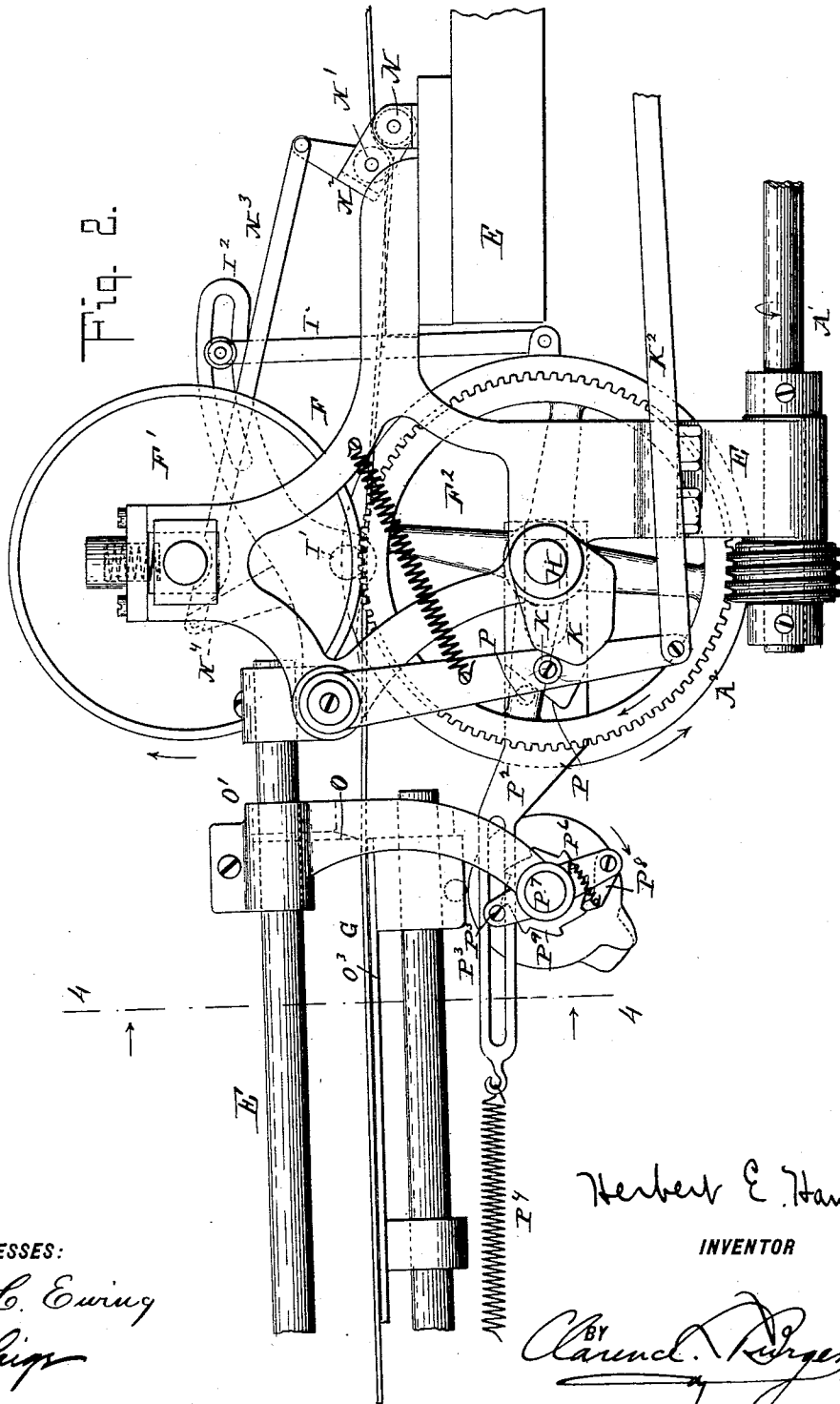
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SEWING MACHINE.

No. 593,577.

Patented Nov. 16, 1897.

Fig. 2.



WITNESSES:

Fred. C. Ewing
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Herbert E. Hawes

INVENTOR

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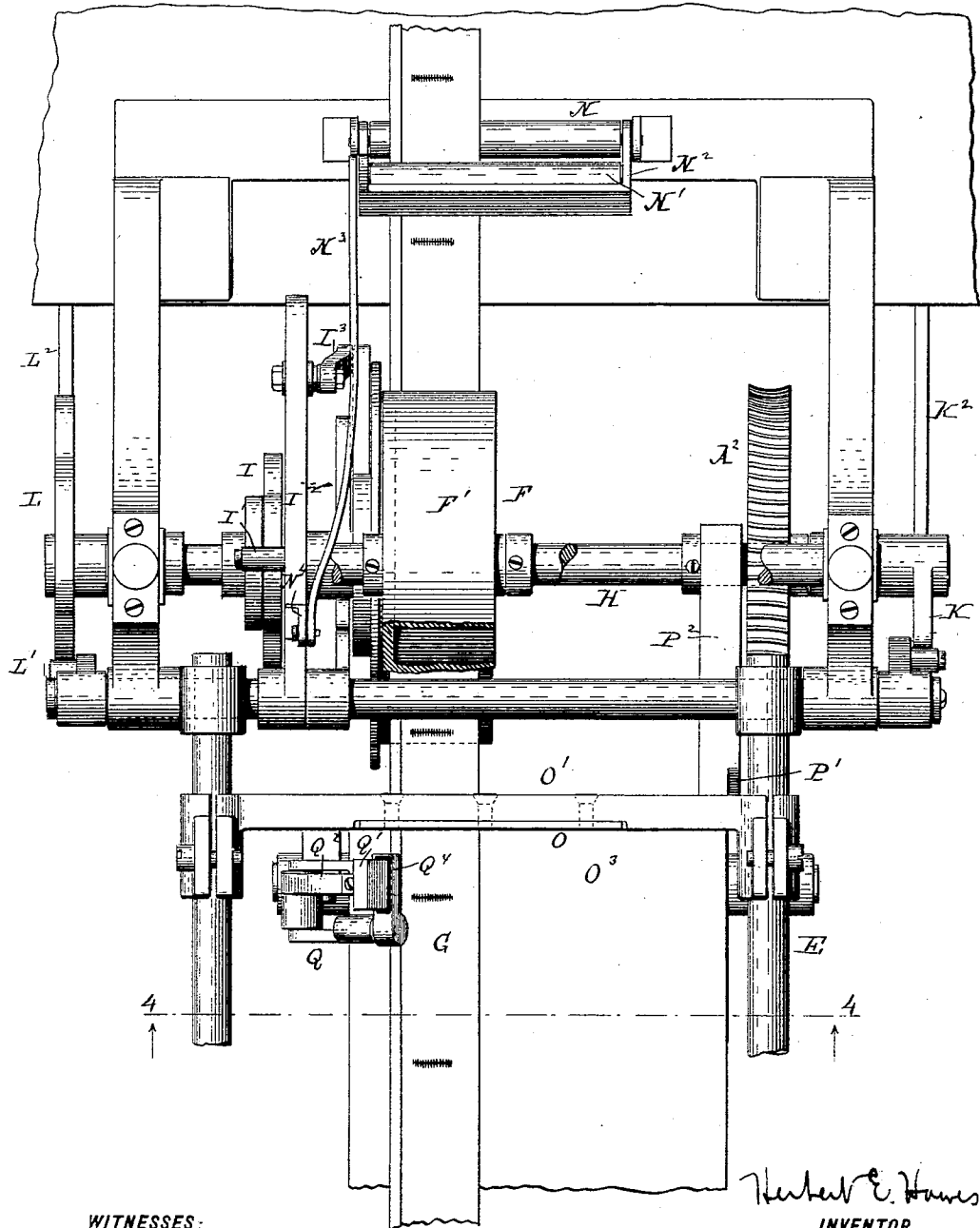
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No. 593,577.

Patented Nov. 16, 1897.



WITNESSES:

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Fig. 3.

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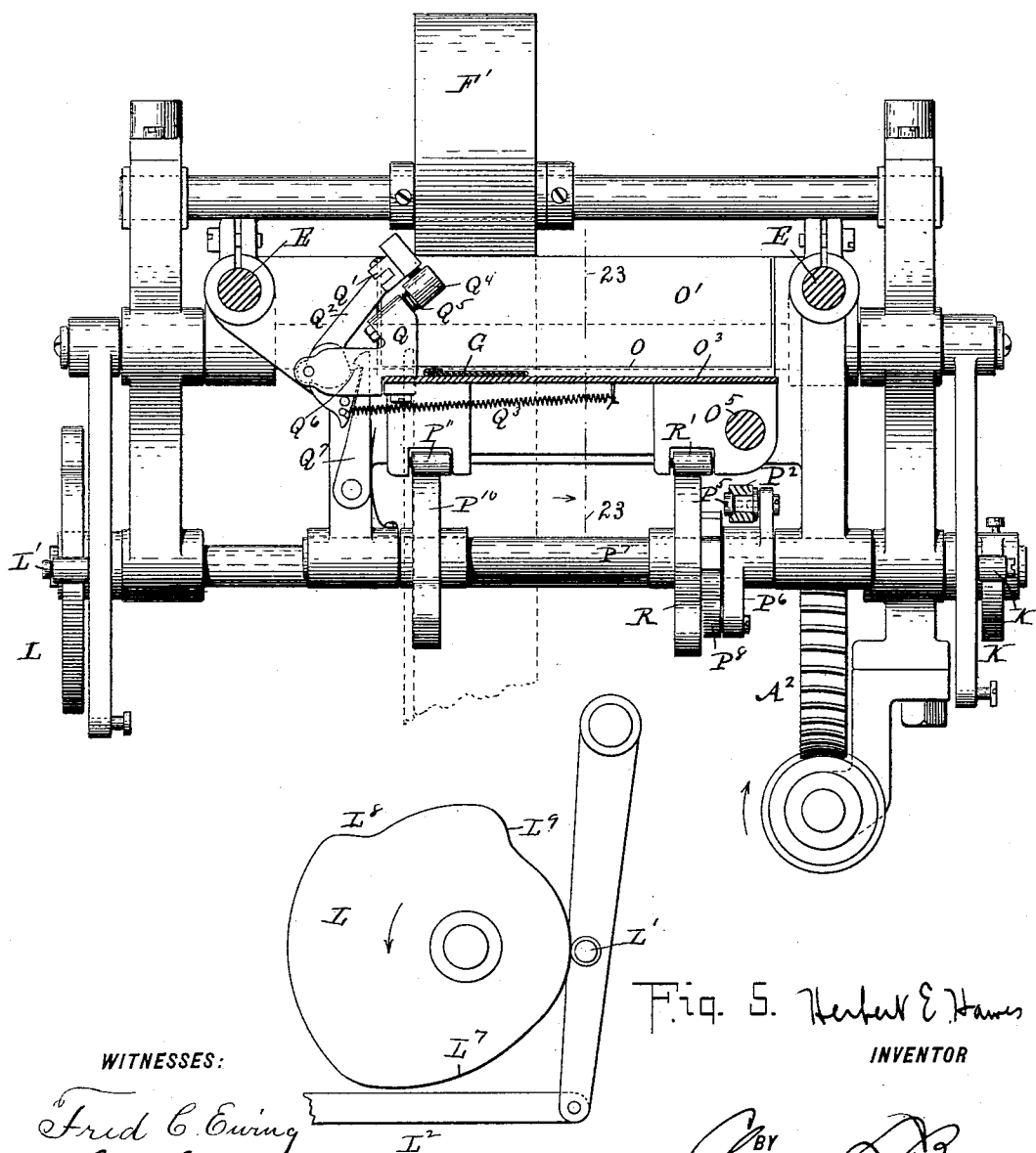
By Clarence A. Briggs
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9 Sheets—Sheet 4.

No. 593,577:

Patented Nov. 16, 1897.

Fig. 4.



WITNESSES:

Fred C. Ewing
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Fig. 5. Herbert E. Haines

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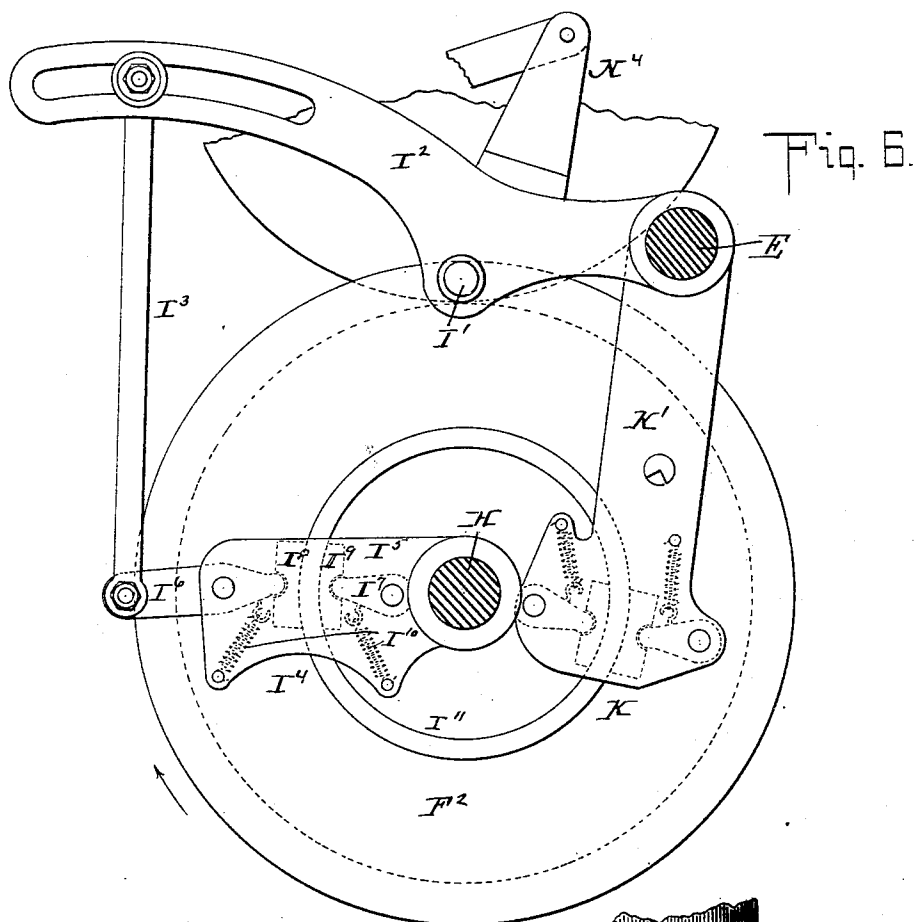
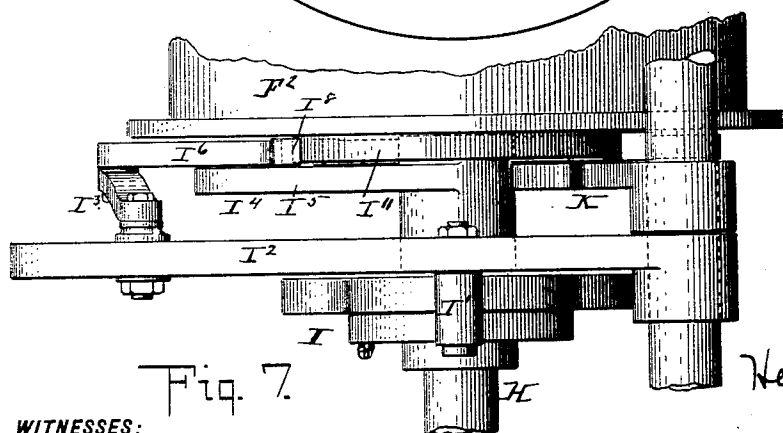
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H. E. HAWES.
SEWING MACHINE.

No. 593,577.

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WITNESSES:

Fred C. Ewing
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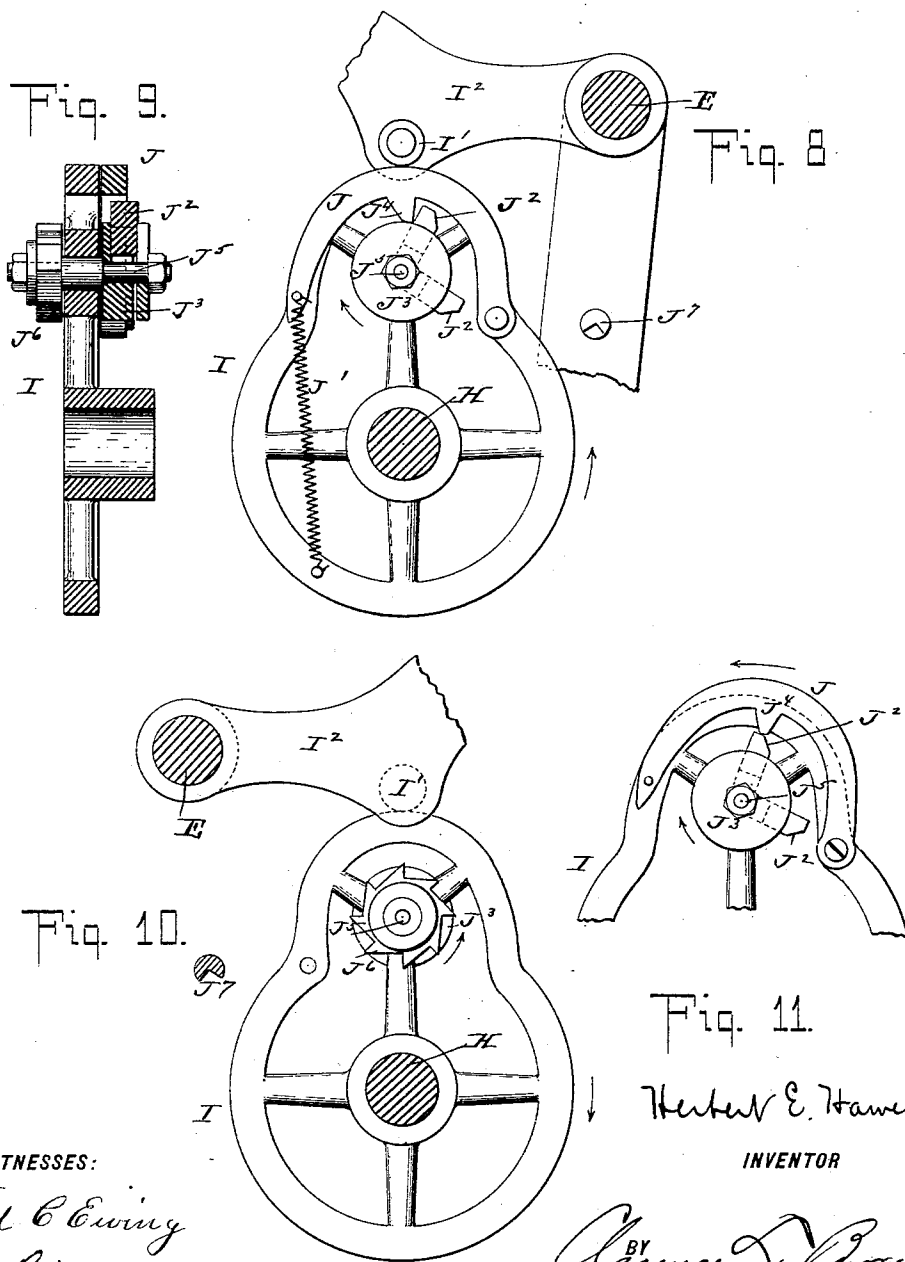
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H. E. HAWES.
SEWING MACHINE.

No. 593,577.

Patented Nov. 16, 1897.



WITNESSES:

Fred C. Ewing
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(No Model.)

9 Sheets—Sheet 7.

H. E. HAWES.
SEWING MACHINE.

No. 593,577.

Patented Nov. 16, 1897.

Fig. 13.

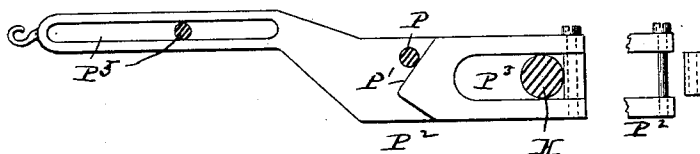


Fig. 14.

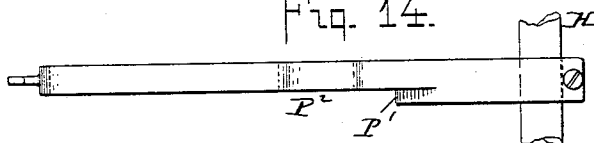
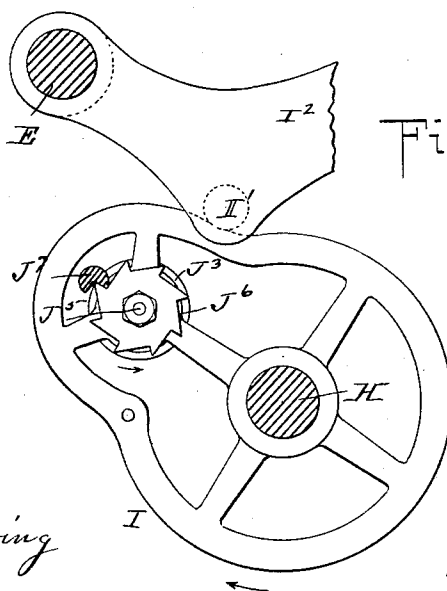


Fig. 12.



WITNESSES:

Fred C Ewing
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Herbert E. Hawes
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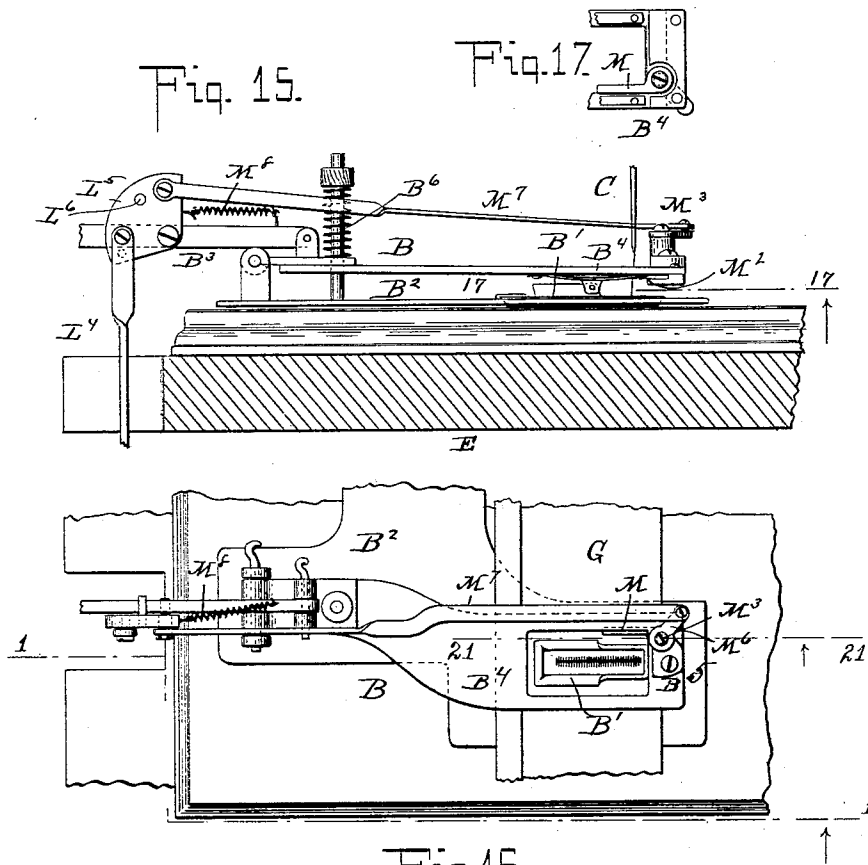
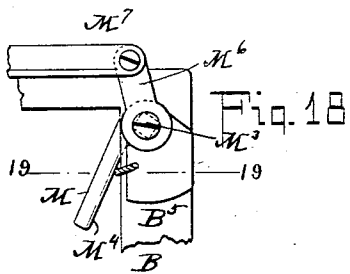
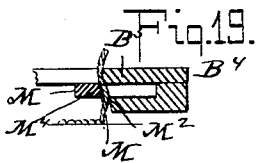
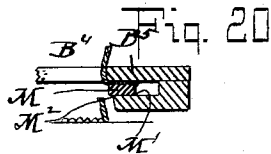
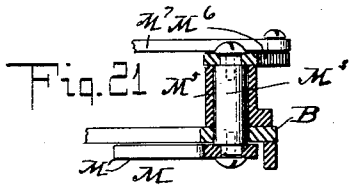
(No Model.)

9 Sheets—Sheet 8.

H. E. HAWES.
SEWING MACHINE.

No. 593,577.

Patented Nov. 16, 1897.



WITNESSES:

Fred. C. Ewing
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9 Sheets—Sheet 9.

Patented Nov. 16, 1897.

Fig. 22.

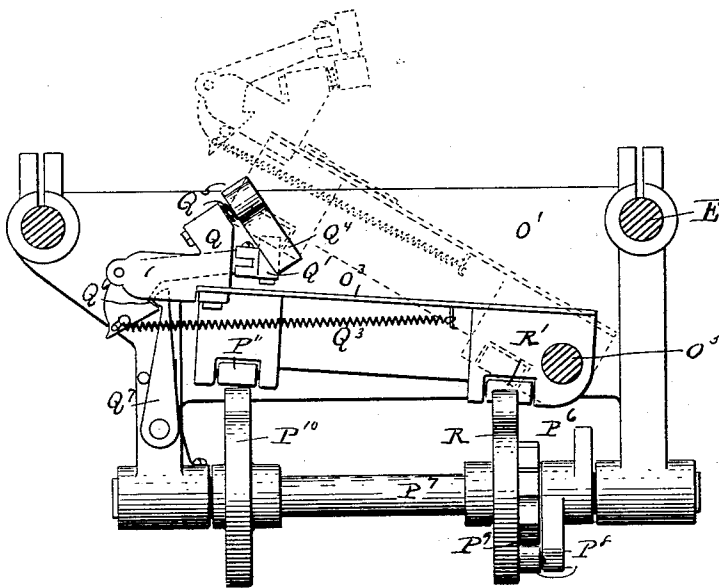
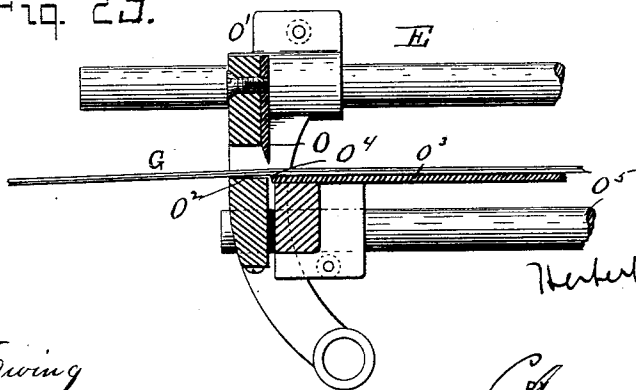


Fig. 23.



Herbert E. Hawes
INVENTOR

BY *Clarence A. Byrne*
ATTORNEY

UNITED STATES PATENT OFFICE.

HERBERT E. HAWES, OF BROOKLYN, NEW YORK, ASSIGNOR TO COLBY & CO., OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 593,577, dated November 16, 1897.

Application filed August 25, 1894. Serial No. 521,306. (No model.)

To all whom it may concern:

Be it known that I, HERBERT E. HAWES, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

While many of the features of this invention are applicable separately and in combination to a diversity of purposes, the special purpose of my invention is to perfect and improve the machine for making buttonhole-waistbands for boys' trousers illustrated in my other application for patent, filed May 4, 1893, Serial No. 472,977, wherein a strip of fabric of indefinite length prepared or suited for forming such waistbands is drawn intermittently through a buttonhole-stitching mechanism, so that the buttonholes are automatically formed in the strip at proper intervals, and said strip can then be divided into the proper lengths to form the buttonhole-waistbands. To this end I have devised mainly novel mechanism for operating the drawing mechanism in harmony with the buttonhole-stitching mechanism, for varying the intervals between the buttonholes, for slackening the strip between the drawing mechanism and the buttonhole-stitching mechanism during and to accommodate the reciprocation of the strip with the work-clamp, for cutting or parting the thread from the work on the completion of each buttonhole or piece of stitching, for fastening and retaining the end of said thread in the needle until the commencement or it may be partial or total completion of the next buttonhole or piece of stitching and for then releasing the thread, for cutting or dividing the buttonholed strip in lengths or sections suitable for waistbands, for applying to each of said strip-sections a trade-mark, stamp, or symbol, and for automatically discharging said marked and buttonholed sections or waistbands from the machine into a receptacle therefor.

In order that my invention may be clearly ascertained, I shall first give a detailed description of the mode in which I carry the invention into practice, and then point out its various features in the claims.

Reference is to be had to the accompanying

drawings, forming part of this specification, in which I have designated the same parts by like letters of reference in all the figures.

Figure 1 is a general side elevation of a waistband-machine embodying my present invention. Fig. 2 is an enlarged side elevation of a part of said waistband-machine, showing in part the strip-slacking, drawing, starting, strip-dividing, and discharging mechanisms. Fig. 3 is a plan view showing substantially the same mechanisms. Fig. 4 is a cross-sectional view substantially on the line 4 4, Fig. 2. Fig. 5 is a detail view showing the work-clamp and thread-partner operating-cam. Fig. 6 is a detail side view showing the mechanism for operating the drawing mechanism intermittently. Fig. 7 is a detail plan view of the same. Figs. 8 and 9 are detail side and sectional views, respectively, of the adjustable cam for operating and regulating the drawing mechanism. Fig. 10 is a detail view of the reverse side of the same. Fig. 11 is a partial view similar to Fig. 8, showing a different adjustment of said drawing-cam. Fig. 12 shows the drawing-cam in another position. Figs. 13 and 14 are detail side and plan views, respectively, of the primary cam and connections for operating the strip-dividing, marking, and discharging mechanisms. Figs. 15 and 16 are side and plan views, respectively, showing the work-clamp, thread-partner, and their operating mechanisms. Figs. 17, 18, 19, 20, and 21 are detail views, hereinafter referred to, showing the operation of the thread-separator. Fig. 22 is a cross-sectional view illustrating the operation of the strip-dividing, marking, and discharging mechanisms. Fig. 23 is a detail sectional side elevation on the line 23 23, Fig. 4, showing the strip-dividing mechanism.

For a buttonhole stitching and cutting mechanism I at the present time employ an ordinary Wheeler & Wilson buttonhole-machine of the kind described in my prior application, Serial No. 472,977, aforesaid, of which Figs. 1, 15, and 16 show the driving mechanism A, the reciprocating work clamp or holder B, the needle C, and the starting mechanism and stop-motion mechanism D. On an extension of the frame E, on which the buttonhole-stitching mechanism is mounted, beyond

and in line with the position of rest of the work-holder B, I fix the strip-drawing mechanism, for which I prefer to employ, as in my aforesaid prior application, Serial No. 472,977, a loose upper drawing-wheel F', pressed yieldingly, as shown in Fig. 2, upon a flanged lower drawing-wheel F², by which it is driven.

The strip G of indefinite length from which the waistbands are to be formed I may previously fold and hem, as by the means described in my prior application, Serial No. 521,307, filed August 25, 1894, or otherwise suitably prepare for the purpose, and I may lead it to the work-holder B by means of a tension device, as described in my prior application, Serial No. 472,977, filed May 4, 1893, or, by means of a suitable guide, directly from a bobbin or roll on which the strip is previously wound, as illustrated in my said prior application, Serial No. 521,307, in connection with the folding attachment.

I arrange the drawing-wheels F' F² to pull the strip G between the presser-foot B' and the lower clamp-plate B² of the work-holder B transversely to the length of the buttonholes, so that the buttonholes will extend transversely of the strip, as shown.

To operate the drawing mechanism F in harmony with the buttonhole-stitching mechanism, I connect the driving mechanism A of the latter by means of a worm-shaft A' and worm-wheel A² with a cam-shaft H, mounted transversely on the frame E of the machine, and on said shaft H, I fix a cam I, (shown in detail in Figs. 8, 9, 10, 11, and 12,) to operate the drawing mechanism F and pull the strip G a predetermined distance through the work-holder B once during each rotation of the said cam-shaft H. For thus operating the drawing mechanism from the cam I, I engage with said cam an antifriction cam-follower I', fixed on a lever I², which is pivoted on the frame E, and is provided, as shown in Fig. 6, with a slot in which is held adjustably one end of a link I³, the other end of which is pivoted to a clutch I⁴, which is itself pivoted to swing on the shaft H. I prefer to form the clutch I⁴ of an arm I⁵, pivoted to swing on the cam-shaft and carrying two pivotal toggle-levers I⁶ I⁷, which are both pivoted to the arm I⁵ and the lever I⁶ to the link I³. The toggle-levers support clutch-shoes I⁸ I⁹, which are held by springs I¹⁰ in engagement with opposite sides of a rim I¹¹, formed on the lower drawing-wheel F². With this construction, as the active part or slope of the cam I swings the lever I², the link I³ will instantly, through the toggle-levers I⁶ I⁷, bind the clutch-shoes I⁸ I⁹ on the rim I¹¹ and rotate the drawing-wheel F² through an arc determined by the stroke of the cam-lever I². As the cam I then causes the link I³ to return by gravity or it may be by a spring the link will instantly loosen the clutch-shoes I⁸ I⁹ on the rim, the springs I¹⁰ yielding, and return the clutch I⁴ to its normal position, where it remains until the next operation of the drawing mechanism. To secure the draw-

ing-wheel F² against movement during the return of the clutch I⁴, I prefer to mount a similar but reversely-arranged friction-clutch K at the opposite side of the rim I¹¹ and on an arm K', depending from the frame E, as shown. The operation of the drawing mechanism would in this way be regulated to draw the strip G forward an equal distance on the completion of each buttonhole thereon, so that the buttonholes will be formed at equal distances apart; but it is often necessary to vary the distances between the buttonholes, and I have therefore provided mechanism for adjusting the cam I, and thus the stroke of the operating-clutch I⁴ and of the drawing-wheel F² at certain predetermined stages in the formation of the series of buttonholes. In the example here given I have shown such cam-adjusting mechanism in Figs. 8, 9, 10, 11, and 12, arranged for the formation of five buttonholes at equal distances, then a longer space, then three buttonholes at shorter and equal distances apart, then a longer space, and so on, each set of three buttonholes being intended for the rear of the completed waistband, the set of five for the front, and the intervening wider spaces for the sides of the waistband.

The cam-adjusting mechanism which I here employ, as shown in Figs. 8 to 12, comprises a pivotal expanding active portion J of the cam I, held in contracted position by a spring J', but adapted to be spread to increase the stroke of the cam I at certain times by cam projections J², held adjustably at the desired points in the periphery of a split disk J³, and engaging as said disk is turned a corresponding cam projection J⁴ on the expanding cam portion J. I cause the automatic rotation of the disk J³ in harmony with the drawing mechanism F, and thus the automatic variation of the drawing, as desired, by fixing the disk J³ on a short shaft J⁵, mounted eccentrically and to turn in the body of the cam I, and fixing on said shaft J⁵ a toothed wheel J⁶, which I arrange to engage, as shown in Fig. 12, a fixed pawl J⁷, and to be turned thereby the distance of one tooth at each rotation of the cam I. The adjustment of the cams J² peripherally and radially on the disk J³ will thus accurately determine the periods and extent of the variation of the drawing and the distances between the buttonholes on the strip.

To insure the starting of the buttonhole-stitching mechanism on the completion of each drawing of the strip, I employ a cam K on the cam-shaft H, arranged to at the proper time and through the cam-follower K', connecting-rod K², and connections K³ operate the starting mechanism D, substantially as described in my prior application, Serial No. 472,977, the cutter being actuated to cut the buttonhole and the stop-motion automatically stopping the stitching on the completion of the buttonhole in the usual way. I cause the presser-foot B' of the work-holder B to

be depressed automatically to clamp the strip G on the completion of each drawing and before or on the starting of the buttonhole-stitching mechanism and to be raised to free the strip on the completion of each buttonhole and before the commencement of the next drawing by means of a cam L, (shown in Fig. 5,) mounted on the cam-shaft H and engaging a cam-follower L', which operates at the proper time to raise and lower the spring-depressed presser-foot B', through the rod L² and angle-lever L³, (shown in Fig. 1,) and the link L⁴, lever-plate L⁵, and stud L⁶ thereon, (shown in Figs. 15 and 16,) the stud L⁶ engaging the upper work-clamp-plate arm B³ as the lever-plate L⁵ is swung on said arm B³, to which it is pivoted. I provide this means of operating the presser-foot B' as a convenient means also of operating my new thread-parter and thread-fastener, which I have invented for the particular purpose of automatically separating the threads from the work on the completion of each buttonhole and for automatically fastening and retaining the separated end of the thread in the needle until the commencement, or it may be whole or partial completion, of the next buttonhole.

The form of thread-parting device which I have illustrated in the drawings, particularly Figs. 15 to 21, consists of a piece M, pivoted in the corner of the upper work-clamp plate B⁴ to swing horizontally across the corner of the slot therein, and thus between the raised needle and the end of the completed buttonhole. I preferably sharpen the lower outer edge M' of the piece M and arrange it to swing between the outer part B⁵ of the upper clamp-plate B⁴ and a blade M², fixed on and below the part B⁵ of the clamp-plate B⁴, so that when the blade M is swung on its pivot M³, as shown in Figs. 18, 19, 20, and 21, its upper edge M⁴, which is preferably rounded, as shown, will carry and grip the thread between it and the part B⁵, and immediately afterward, or it may be at the same time, the blade M' of the movable piece M will cooperate with the fixed blade M² to shear, cut, or part the threads from the work, while the parted end thereof will remain fastened, as described, and thus retained in the needle. As a convenient means of operating this form of thread parting and fastening device automatically on the completion of the stitching of each buttonhole, I mount the vertical pivot M³, to which the movable piece M is fixed, in a bearing M⁵, erected on the upper clamp-plate B⁴, and provide said pivot with an arm M⁶, which I connect by means of an operating-rod M⁷ with the lever-plate L⁵, before described, for raising the presser-foot. I so adjust this presser-foot and thread parter and fastener operating mechanisms that on or after the completion of each buttonhole and before the ensuing drawing, as before described, the incline L⁷ of the cam L, Fig. 5, first operates the lever-plate L⁵, and thus the

piece M, so as to part and grip the thread without acting on the presser-foot until the stud L⁶ on the lever-plate L⁵ strikes the operating-arm B³ of the upper clamp-plate, when the presser foot is also raised and the work freed to permit the drawing. On the completion of the ensuing drawing and before the commencement of the next buttonhole, the presser-foot and thread parter and fastener being meanwhile retained in position by the cam-lever L⁷, the presser-foot is first permitted by the cam-decline L⁸ to be depressed upon the work by its spring B⁶, the stud being meanwhile retained against the upper clamp-plate arm B³ and the end of the thread thus still fastened, then the stitching of the next buttonhole commences, and when it has progressed far enough for the piece M to clear the needle and thread the cam-decline L⁹ permits or causes the piece M to be returned by its spring M⁸ to its primary cutting position and the gripped end of the thread, now retained by the stitching, to be released.

I have also devised a slacking mechanism for easing or slacking the strip G between the drawing mechanism and the buttonhole-stitching mechanism during the reciprocation of the work-holder, and thus prevent the same from drawing on the strip, substantially as illustrated in Figs. 2 and 3, wherein it will be seen I conduct the strip from the work-holder to and between the two roller-guides N and N', the guide N being stationary on the frame of the machine and the guide N', mounted in bearings N², pivoted on the mountings of the guide N and having an operating-arm connected by a rod N³ with an arm N⁴ on the drawing cam-lever I², so that on the return of said lever after each drawing and during the initial operation of the buttonhole-stitching mechanism the movable guide N² will be swung upward out of line with—that is, over the fixed guide and slack—the strip G, and on the completion of the buttonhole and stoppage of the work-holder the strip will by the same means be again taken up before or with the commencement of the drawing.

I also provide mechanism for dividing the buttonholed strip G into sections of the required length, each to make a buttonhole-waistband, substantially as follows. As best shown in Figs. 2, 3, 4, 22, and 23, I mount on the frame of the machine in the line of feed and beyond the drawing mechanism a transverse vertical blade O, beneath the lower cutting edge of which the strip G is thus fed by the drawing-wheels F' F². I fix the blade O on a blade-holder O', which I make adjustable on the frame E, longitudinally to and from the drawing mechanism, so that the division of the strip G can be accomplished at the required points of the buttonholed strip. On the adjustable blade-holder O', I likewise provide a narrow table O², below and immediately in advance of the blade O, to conduct

the strip G thereto, and immediately below and beyond the blade O, I arrange a table O³ to conduct the strip G therefrom. I further prefer to constitute of the edge O⁴ of the eduction-table O³ a lower cutting-blade to coöperate with the upper blade O and cut or divide the strip passing therebetween, and for this purpose I arrange the said lower blade O⁴ to swing upward across the said upper blade O by providing the eduction-table O³ with bearings on one side thereof mounted on a longitudinal pivot O⁵, held in the upper adjustable blade-holder O' and in the frame of the machine. To accomplish the operation of this form of strip-divider at the required time on the completion of a certain number of forward drawings, I fix an antifriction cam-follower P on the cam-shaft driving worm-wheel A² to engage and actuate a cam P', fixed on a slide-bar P², having a slot P³ to ride on the cam-shaft H, and reciprocated in opposition to the cam-follower P by a spring P⁴. In the slide-bar P² is formed a slot to which I fasten adjustably by means of a screw P⁵ one end of a lever P⁶, which is pivoted on a shaft P⁷, mounted in bearings on the adjustable blade-holder, the adjustable connection of the lever P⁶, and slide-bar P² to permit the adjustment of the strip-divider before referred to.

The pivotal lever P⁶ carries a pawl P⁸, which engages and turns the distance of one tooth a ratchet-wheel P⁹, fixed on the shaft P⁷, which ratchet-wheel in this instance I provide with eight teeth, so that the shaft P⁷ is rotated once for each eight reciprocations of the slide-bar P² and revolutions of the controlling cam-shaft H. On the cam-shaft P⁷, I fix also a secondary cam P¹⁰ to engage a cam-follower P¹¹ on the movable eduction-table O³, and thus operate the strip-divider once for each eight operations of the buttonhole stitching and drawing mechanisms, so that in this instance the strip G will be divided on the completion of each set of eight composed of separate sets of five and three buttonholes.

I also provide mechanism for stamping or otherwise applying a name, symbol, or other mark to each section of the strip so divided substantially as follows: As best illustrated in Figs. 3, 4, and 22, I fix on the rising side of the eduction-table O³ a standard Q, on which I pivot to swing toward and from the strip G, passing over said table O³, a stamp Q', bearing the mark or device to be applied to the waistbands, and connect the shank Q² of said stamp to the table O³ by a spring Q³ to normally hold the stamp elevated above the strip. On the standard Q, I also pivot an inking-pad Q⁴, which is pressed normally against to ink the face of the stamp Q' by a spring Q⁵, but is arranged to be swung downward out of the way by said stamp when the latter is swung on its pivot down upon the strip G. I likewise form the shank Q² of the stamp Q' with a shoulder Q⁶, which is automatically and normally engaged by a spring-

actuated catch Q⁷, pivoted on the blade-holder O', when the eduction-table O³ is lowered, as shown in Fig. 4, in such a manner that when the eduction-table O³ is swung upward, as before described, to divide the strip the shank of the stamp Q' on the table O³ will be detained by the fixed catch Q⁷ until the stamp is swung downward thereby past the inking-pad Q⁴ and upon the strip G, as indicated in Fig. 22, marking the same, when the catch Q⁷ slips off the shoulder Q⁶ on the stamp-shank and allows said stamp to be again thrown upward over the inking-pad by its spring Q³. I finally provide mechanism for automatically discharging the strip-sections or waistbands thus marked substantially as follows and as best shown in Figs. 4 and 22, wherein it will be seen that I fix an additional cam R on the secondary cam-shaft P⁷ to engage a cam-follower R' on and near the pivoted side of the eduction-table O³, so as to follow up the action of the divider and marker operating secondary cam P¹⁰, (the cam or follower P on the primary cam-shaft H acting as their primary controlling-cam,) and thus after each strip-section or waistband is cut and marked to still further tilt the eduction-table O³, as indicated in dotted lines in Fig. 22, and cause the waistband to slide or fall off the lower side thereof into such receptacle as may be placed to receive the same.

It will be understood that I do not intend to limit my invention to any of the special forms or combinations of mechanisms herein shown and described, as I may in practice employ vastly different forms of mechanisms to the same end and may omit any of the various component mechanisms without materially affecting the operation of the others in so far as my invention is concerned.

It is evident that I can readily apply the thread-parting and thread-fastening devices herein shown to each of the work-clamps of the multiple buttonhole-machine illustrated in Letters Patent No. 441,053, issued to Messrs. C. H. and T. E. Colby November 18, 1890, and operate all the thread parting and fastening devices simultaneously from separate arms on the common presser-foot-operating bar similarly by a simple adaptation of the method herein illustrated in connection with the single presser-foot-operating lever-plate.

Having thus described the manner in which I practice my invention, I claim as new the following:

1. The combination with buttonhole stitching and feeding mechanisms, of strip-drawing, strip-slacking, thread-parting, strip-dividing, strip-marking and strip-discharging mechanisms.

2. The combination of a buttonhole-stitching machine including its work-clamp, coöperating mechanism to draw a continuous strip of fabric intermittently through the work-clamp, coöperating mechanism to close the work-clamp and start the buttonhole-stitching mechanism after each drawing, and co-

operating mechanisms to, after the stitching of each buttonhole, stop the stitching mechanism, sever the thread from the work, open the work-clamp and repeat the drawing.

3. The combination, of a buttonhole-stitching machine, including its work-clamp, cooperating mechanism to draw a continuous strip of fabric intermittently through the work-clamp, cooperating mechanism to close the work-clamp and start the buttonhole-stitching mechanism after each drawing, and cooperating mechanisms to, after the stitching of each buttonhole, stop the stitching mechanism, sever the thread from the work, clamp the severed end of the thread, open the work-clamp and repeat the drawing.

4. The combination, with a buttonhole-stitching machine, including its work-clamp, a cam operating with the machine, a cam-follower and connections whereby said cam opens the work-clamp after the stitching of each buttonhole, of a thread-cutter and a thread-clamp, and operating connections whereby the thread-cutter and thread-clamp are also actuated by the said work-clamp-operating cam-follower.

5. The combination, with the movable clamp-plate of a sewing-machine, having an operating-arm B³, of a thread-cutter and thread-clamp pivoted on the said clamp-plate and having an operating-arm M⁶, a lever L⁵ pivoted on the clamp-plate arm and carrying a stop L⁶ to engage the arm B³, a rod M⁷ connecting the arm M⁶ and the lever L⁵, and means to operate the lever L⁵.

6. A work-clamp for a buttonhole-stitching machine provided with a thread cutting and clamping piece pivoted to the upper work-clamp plate to swing between it and a cutting-plate rigidly attached to the said upper clamp-plate and with means for operating the thread cutting and clamping piece.

7. A work-clamp for a buttonhole-stitching machine provided with a thread cutting and clamping piece pivoted to the upper clamp-plate to swing between it and a cutting-plate fixed across the outer extremity of the buttonhole-slot in the said clamp-plate and with means for operating the thread cutting and clamping piece.

8. A work-clamp for a buttonhole-stitching machine provided with a thread-cutting blade pivoted to an upper member of the work-clamp so as to swing across the buttonhole-slot therein from a position substantially parallel to the said slot to one substantially transverse thereto.

9. The combination, with a buttonhole-stitching machine, including its work-clamp, and a wheel to draw a continuous strip through the work-clamp, of a clutch-rim connected to said drawing-wheel, a clutch-shoe to frictionally engage the clutch-rim, and mechanism cooperating with the buttonhole-stitching machine to cause the clutch-shoe to

move the wheel after the stitching of each buttonhole and to arrest the movement of the clutch-shoe during the stitching of the next buttonhole.

10. The combination, with the buttonhole-stitching machine and the strip-drawing mechanism, provided with an operating-rim, of a clutch-shoe to frictionally engage said rim, a clutch-shoe-carrying arm, and a clutch-shoe-operating lever pivoted on said arm and reciprocating connections between said shoe-operating lever and the buttonhole-stitching machine.

11. The combination, with the buttonhole-stitching machine and the strip-drawing mechanism provided with an operating-rim, of clutch-shoes to frictionally engage said rim and a toggle device to operate said clutch-shoes and reciprocating connections between said toggle device and the buttonhole-stitching machine.

12. The combination, with the buttonhole-stitching machine, and the strip-drawing mechanism and its operating-rim, of a pivotal arm, toggle-levers pivoted thereon, rim-engaging clutch-shoes on said toggle-levers, a cam and connections to reciprocate one of said toggle-levers and cam-driving mechanism connected with the buttonhole-stitching machine.

13. The combination, with the buttonhole-stitching machine, and the strip-drawing mechanism, its operating-rim, and a clutch for intermittently operating said rim, of rim-engaging clutch-shoes to hold said rim against a return movement, and toggle-levers carrying said return stopping clutch-shoes and reciprocating connections between said operating-clutch and the buttonhole-stitching machine.

14. The combination with the sewing-machine and the cooperating drawing mechanism operated by a primary cam provided with an adjustable part, of a secondary cam mounted to revolve on said primary cam and having a series of slopes to control said adjustable part.

15. The combination, with the sewing-machine and the cooperating drawing mechanism operated by a primary cam, provided with an adjustable part, of a secondary cam revolving on the primary cam in harmony therewith, to control said adjustable part automatically.

16. The combination with the sewing-machine and the cooperating drawing mechanism operated by a primary cam provided with an adjustable part, of a secondary cam mounted to revolve on the primary cam to control said adjustable part, a ratchet-wheel carried on the primary cam to operate said secondary cam, and a pawl to actuate said ratchet-wheel in harmony with the primary cam.

17. The combination, with the sewing-machine and the cooperating drawing mechanism operated by a primary cam having an ad-

justable part, of a disk mounted to turn on said primary cam, and secondary adjusting-cams mounted adjustably on said disk.

18. The combination, with the sewing-machine, the drawing mechanism, its operating-rim, and the clutch to engage said rim, of the clutch-operating lever having a longitudinal slot, and a clutch-operating rod held adjustably in said slot and reciprocating connections between said lever and the sewing-machine.

19. The combination, with the sewing-machine and a strip-drawing mechanism operating in harmony therewith, of a strip-slacking mechanism between the drawing mechanisms and the sewing-machine and operating connections between the strip-slacking mechanism and the sewing-machine, whereby the slack of the strip is automatically controlled by the sewing-machine.

20. The combination, with a sewing-machine, and a strip-drawing mechanism operating in harmony therewith, of a strip-slacking mechanism controlled by a cam operating in harmony with the strip-drawing mechanism.

21. The combination, with a sewing-machine and a strip-drawing mechanism operating in harmony therewith, of a pair of adjustable guides for the strip between the sewing mechanism and the drawing mechanism, and operating connections between said adjustable guides and the drawing mechanism.

22. The combination, with a sewing-machine, an adjustable strip-drawing mechanism, a strip-dividing mechanism and means for adjusting the strip-dividing mechanism to and from the drawing mechanism to accord with the variable advance of the said adjustable drawing mechanism.

23. The combination, with a strip-drawing mechanism, of a depending strip-blade, a strip-guiding table carrying a strip-shearing edge to cooperate with said blade, and means for raising said table to divide the strip and at the same time displace the several strip-sections from the line of feed.

24. The combination with the depending strip-blade, of the strip-guiding table carrying a shearing edge to cooperate with said blade and pivoted to tilt laterally to divide the strip.

25. The combination, with the depending strip-blade and the strip-guiding table carrying a shearing edge to cooperate with said blade, of a cam to raise said table and divide the strip.

26. The combination, with the movable strip-table and the strip-marking device, of mechanism whereby the movable strip-table operates the strip-marking device.

27. The combination with the movable strip-table and the marker pivotally mounted thereon, and having a catch-shoulder, of a catch to temporarily engage said shoulder and operate the marker.

28. The combination, with the strip-table, of the marker pivoted thereon, and the inking-pad pivoted on said table to swing over the marker and be pressed aside thereby.

29. The combination, with a buttonhole-stitching machine and a fabric-strip-drawing mechanism operating intermittently with the buttonhole-stitching mechanism, of strip-dividing and discharging mechanisms, and connecting mechanism whereby the strip-dividing and strip-discharging mechanisms are operated only after a predetermined series of successive buttonhole stitching and drawing operations.

30. The combination with a fabric-strip-drawing mechanism and a strip-dividing mechanism, of a pivotal strip-guiding table, beyond the dividing mechanism, and mechanism for tilting the strip-guiding table and discharging the severed strip-section after each strip drawing and dividing operation.

31. The combination, with a depending strip-dividing blade, of a strip-guiding table carrying a strip-dividing blade and means for tilting said table to divide the strip and discharge the strip-section.

32. The combination, with a sewing-machine, a strip-drawing mechanism and a strip-dividing mechanism, of a strip-section receiving and discharging table and mechanisms for tilting said table including a cam operating in harmony with the sewing-machine.

33. The combination, with a strip-drawing mechanism, a strip-dividing blade, and a strip-dividing and discharging table, of strip-dividing and strip-discharging cams operating said table progressively.

34. The combination, with the depending strip-dividing blade, of the strip-table pivoted to tilt laterally and carrying a strip-dividing blade and cam-followers on opposite sides, and strip-dividing and strip-discharging cams respectively engaging said followers.

35. The combination, with a buttonhole-stitching machine, including a work-clamp and buttonhole-feeding mechanism, of a strip-drawing mechanism operating intermittently therewith, a thread-cutter in juxtaposition to the work-clamp of the machine, and mechanism for operating the thread-cutter between the completion of each buttonhole and the succeeding drawing.

36. The combination, with a buttonhole-stitching machine, including buttonhole-feeding mechanism, of a fabric-strip-drawing mechanism, a thread-cutting mechanism, and a fabric-strip-dividing mechanism.

37. The combination, with a buttonhole-stitching machine, including buttonhole-feeding mechanism, of a fabric-strip-drawing mechanism, a thread-cutting mechanism, and a strip-marking mechanism.

38. The combination, with a buttonhole-stitching machine, including buttonhole-feeding mechanism, of a fabric-strip-drawing mechanism, a thread-cutting mechanism, a

strip-dividing mechanism and a strip-discharging mechanism.

39. The combination, with a buttonhole-stitching machine, including buttonhole-feeding mechanism, of a fabric-strip-drawing mechanism, a thread-cutting mechanism, a strip-dividing mechanism and a strip-marking mechanism.

In testimony whereof I, the said HERBERT E. HAWES, have hereunto set my hand, in the city of New York, this 21st day of August, in the year 1894.

HERBERT E. HAWES.

In presence of—

CLARENCE L. BURGER,
EDWIN L. KALISH.