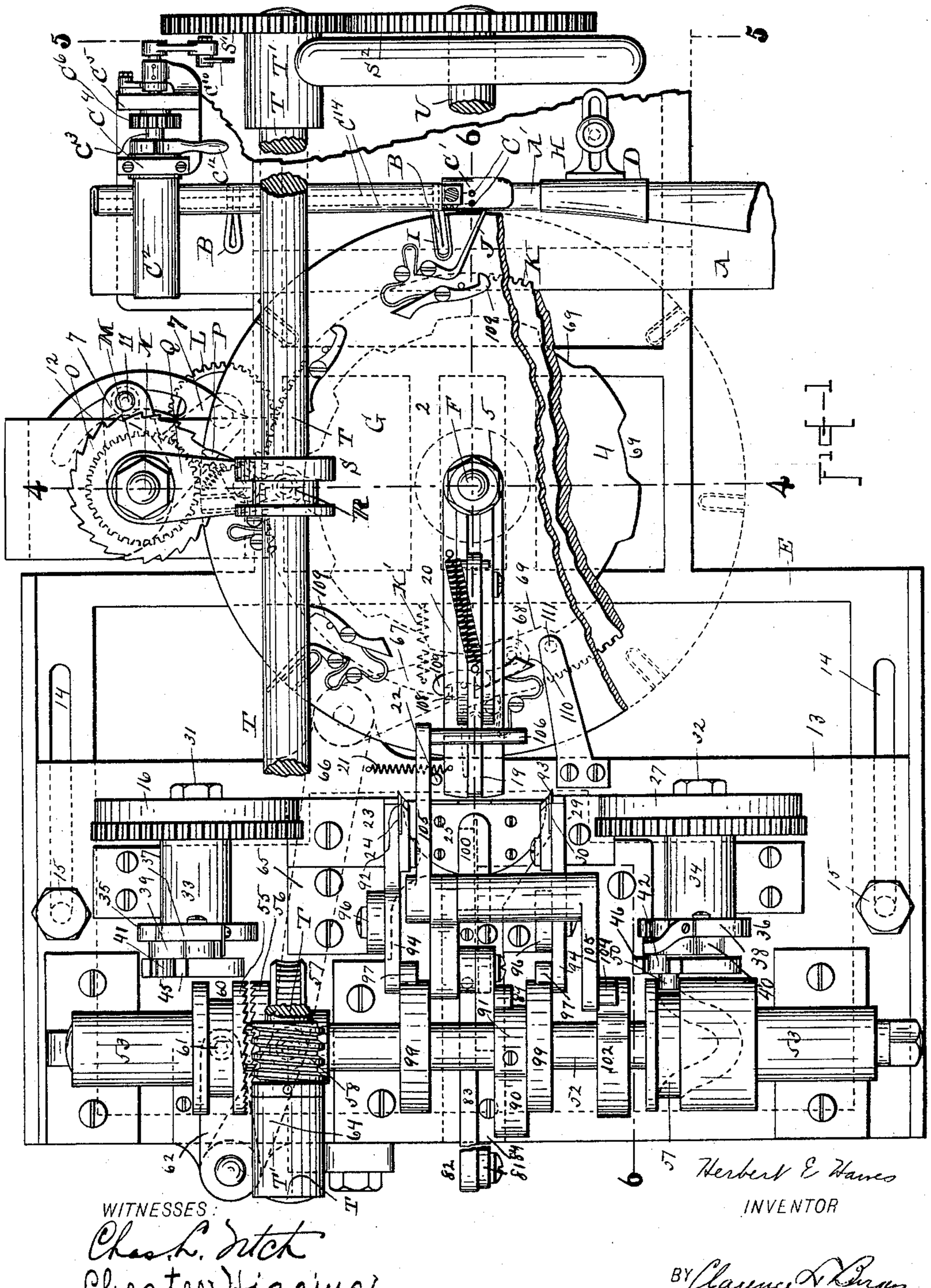
(No Model.) 6 Sheets—Sheet 1.

H. E. HAWES.

MACHINE FOR MAKING LOOP WAISTBANDS.

No. 596,504. Patented Jan. 4, 1898.



WITNESSES:
Chas. L. Dutch
Chester Higgins

INVENTOR
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ATTORNEY

(No Model.) 6 Sheets—Sheet 2.

H. E. HAWES.

MACHINE FOR MAKING LOOP WAISTBANDS.

No. 596,504. Patented Jan. 4, 1898.

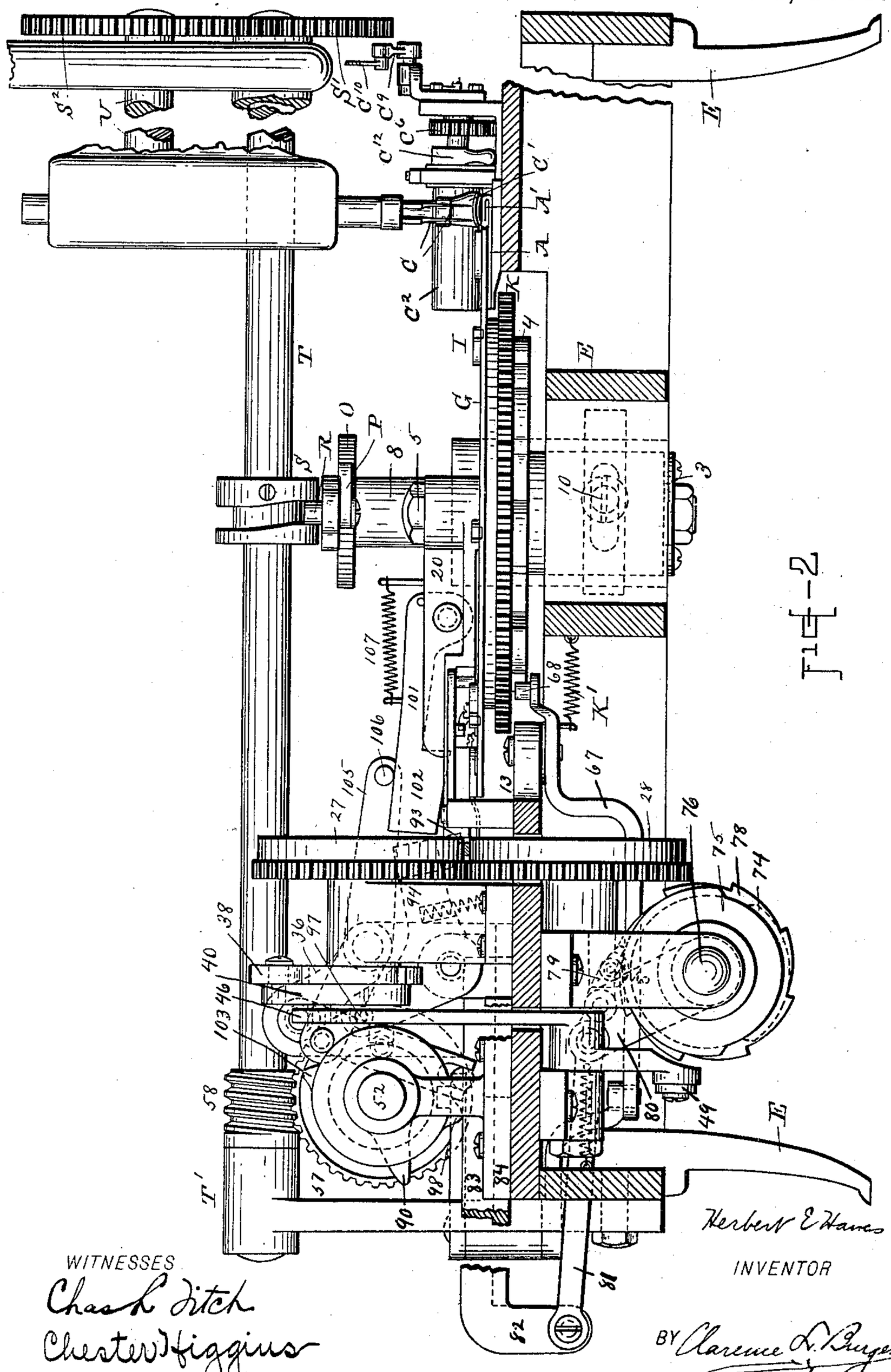

FIG-2

WITNESSES.
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INVENTOR

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(No Model.) 6 Sheets—Sheet 3.

H. E. HAWES.

MACHINE FOR MAKING LOOP WAISTBANDS.

No. 596,504. Patented Jan. 4, 1898.

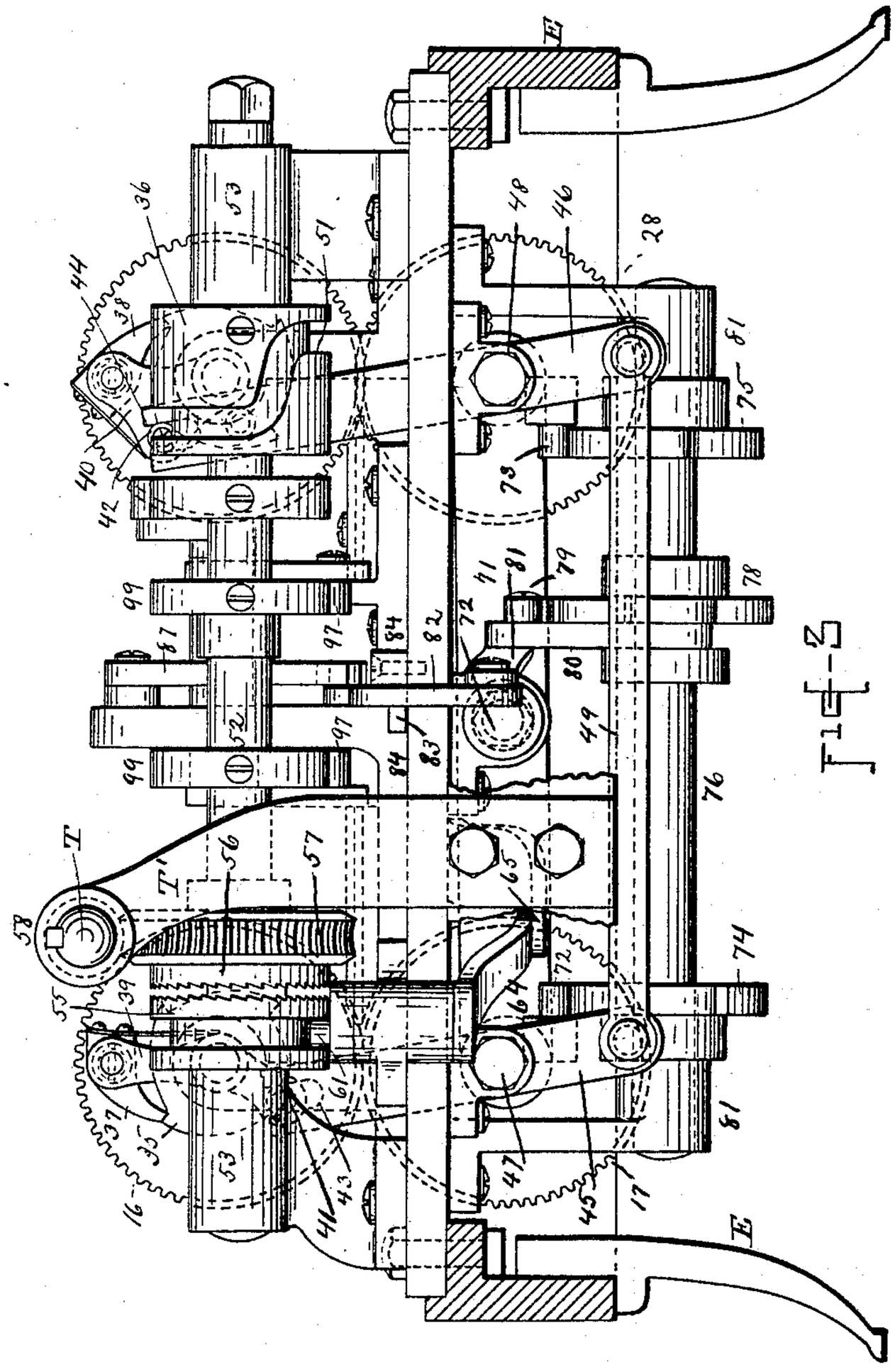

FIG. 2.

WITNESSES:
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ATTORNEY.

(No Model.) 6 Sheets—Sheet 4.

H. E. HAWES.

MACHINE FOR MAKING LOOP WAISTBANDS.

No. 596,504. Patented Jan. 4, 1898.

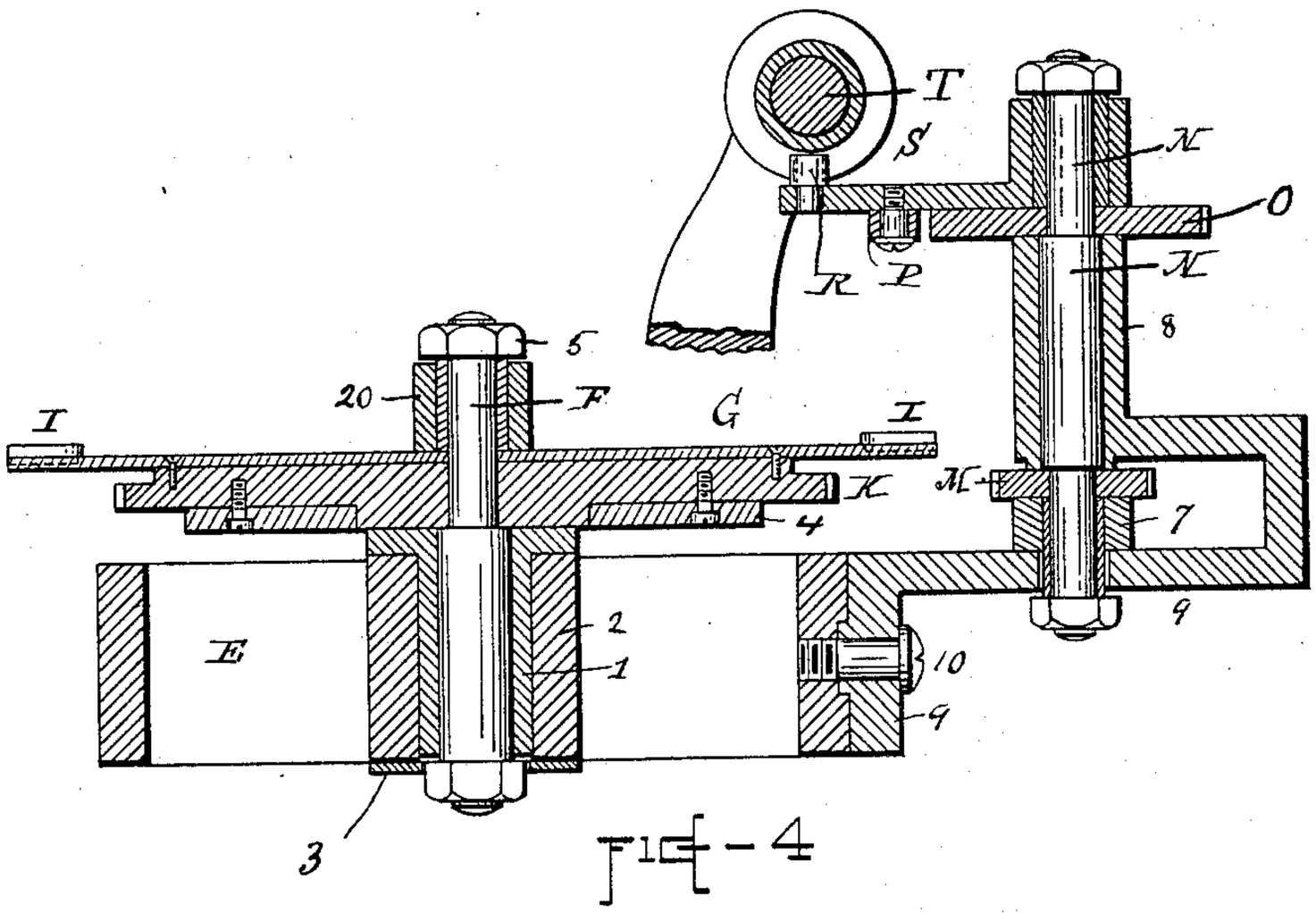

FIG-4

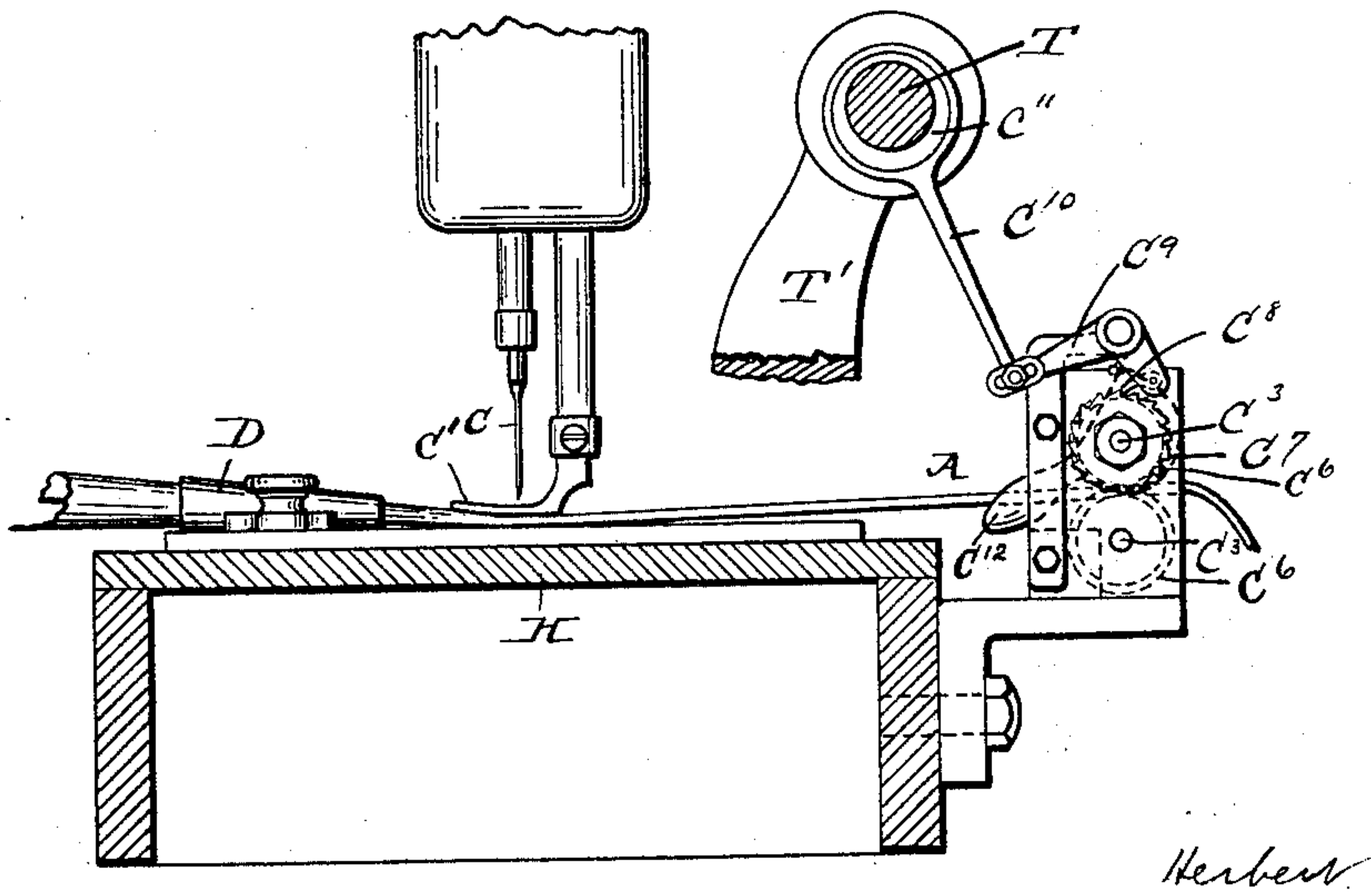

FIG-5

WITNESSES:
Chas. L. Ditch
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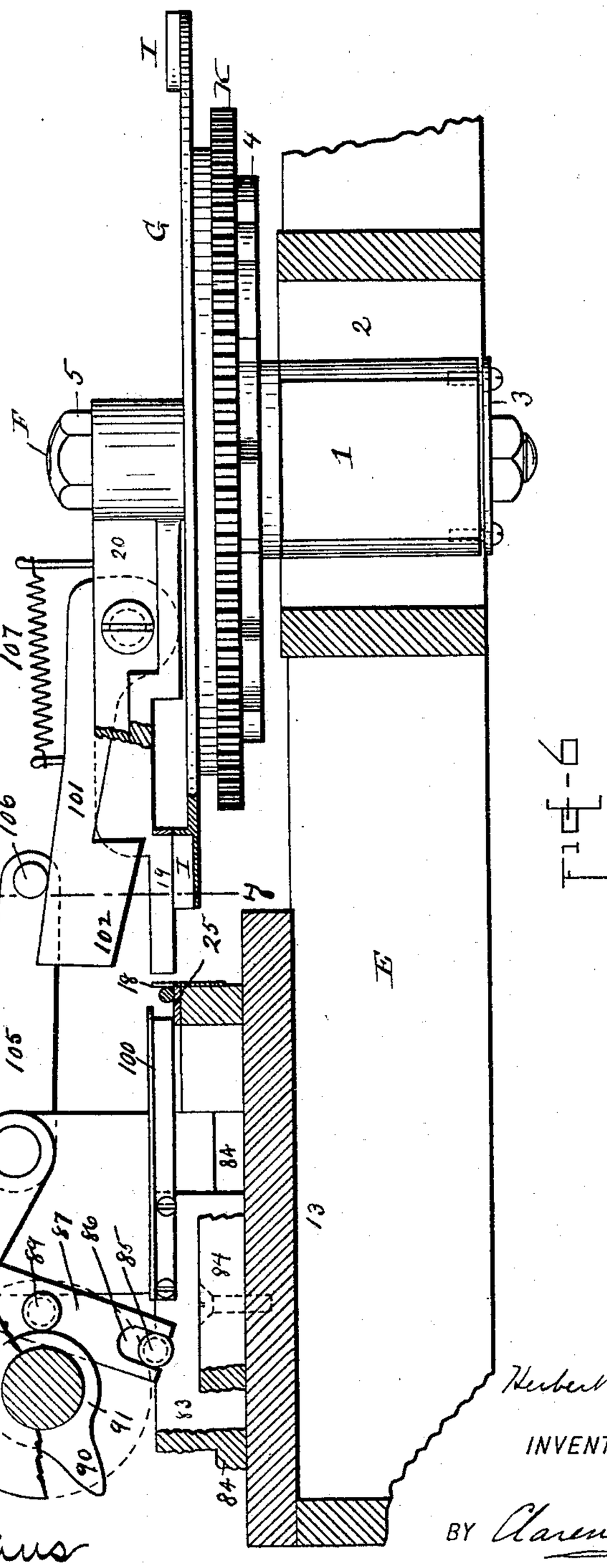
(No Model.) 6 Sheets—Sheet 5.

H. E. HAWES.

MACHINE FOR MAKING LOOP WAISTBANDS.

No. 596,504. Patented Jan. 4, 1898.



WITNESSES:
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(No Model.) 6 Sheets—Sheet 6.

H. E. HAWES.

MACHINE FOR MAKING LOOP WAISTBANDS.

No. 596,504. Patented Jan. 4, 1898.

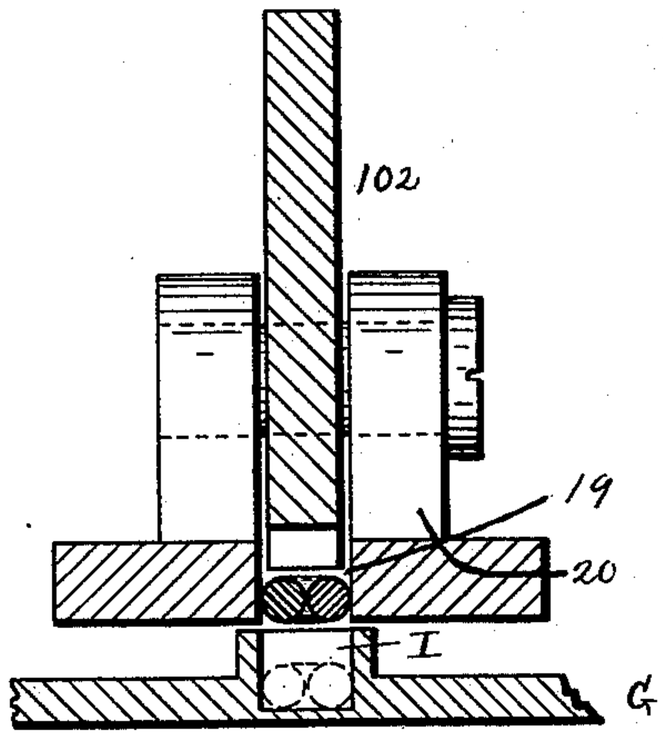

FIG. 7

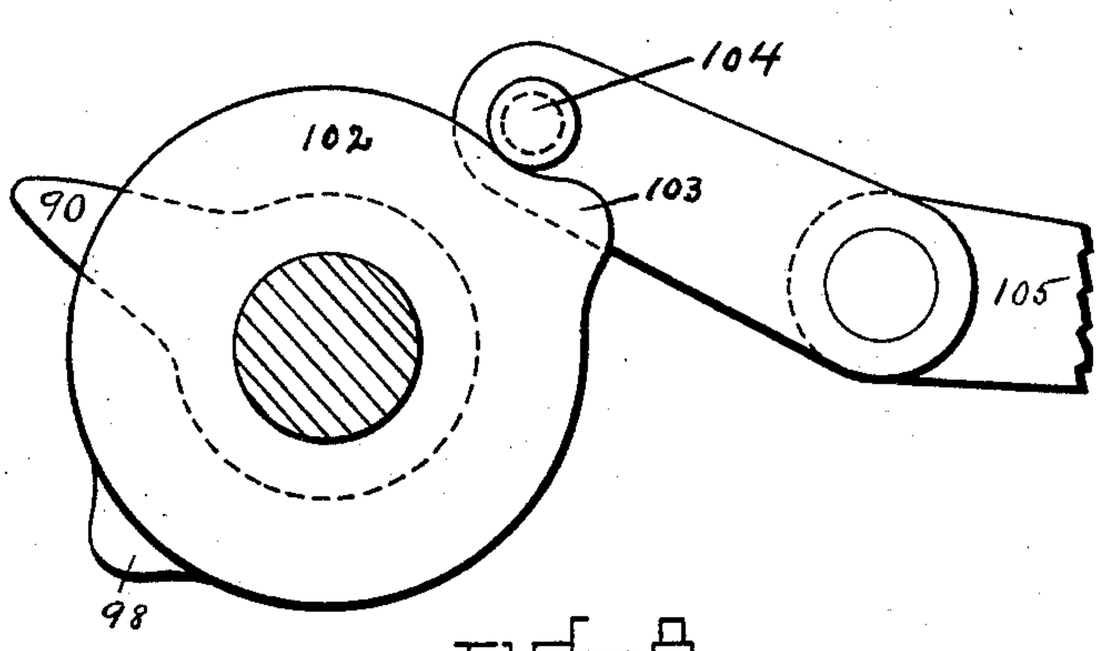

FIG. 8

WITNESSES:
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Chester Higgins

Herbert E. Hawes
INVENTOR
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ATTORNEY

UNITED STATES PATENT OFFICE.

HERBERT E. HAWES, OF BROOKLYN, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO COLBY & CO., OF SAME PLACE.

MACHINE FOR MAKING LOOP-WAISTBANDS.

SPECIFICATION forming part of Letters Patent No. 596,504, dated January 4, 1898.

Application filed March 6, 1897. Serial No. 626,288. (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 new and useful Improvements in Machines for Making Loop-Waistbands; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to the manufacture of waistbands for boys' short trousers of the kind which have tabs, usually of cord loops, attached thereto in lieu of or in addition to buttonholes for fastening to the buttons on the shirt-waist. In a common form of these loop-waistbands the button-engaging loops are fastened at their ends within a hem formed along the bottom of the waistband and the bands are made by hemming a continuous strip of fabric by means of a folding and hemming sewing-machine and introducing the ends of the loops by hand beneath the fold at the proper points, previously marked on the strip, immediately prior to the stitching of the fold to form the hem, so that the loops will be fastened in the hem by the hemstitching. The continuous hemmed strip with the attached loops is then cut up into individual "loop-waistbands." These loop-bands are usually made with eight loops, with equal spaces between the first three, which come on the back of the trousers, and the same equal spaces between the last five, which come on the front of the trousers, but with a longer space between the third and fourth loops. The three loops for the back are often made of elastic cord, so as to yield to the forward bending of the body.

The specific form of machine described herein, in which I have reduced my invention to practice, is especially designed in its entirety for making continuously and automatically tab-waistbands of the last-described kind—namely, those having three elastic-cord loops and five inelastic-cord loops secured within the hem of the waistband; but it will appear that my invention is likewise applicable to applying tabs of various other kinds and in various other ways and its several features to various other purposes.

In its entirety my invention comprises briefly, means for feeding different cords, in this instance elastic and inelastic cords, at different times, means for cutting said cords into sections, means for forming loops of said sections, means for feeding and hemming a continuous waistband-strip, and means for delivering the ends of said loops to form tabs at predetermined intervals beneath the open hemfold of the continuous waistband-strip as the same is fed through the hemming mechanism and between the hemfolding and the hemstitching operations, so that the ends of the loops will be automatically attached to the continuous strip within the hem by the hemstiching and the heads of the loops will project therefrom, the continuous loop-waistband being afterward cut into individual loop-waistbands by hand or by any suitable intermittently-operated strip-cutting mechanism.

Having thus set forth the nature of my invention, I shall now describe in detail the manner in which I carry it 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 the same parts are designated by like characters in all of the views.

Figure 1 is a plan view of a machine in which I have reduced my invention to practice, certain non-essential parts being omitted. Fig. 2 is a sectional side elevation of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a cross-sectional elevation on the line 4 4, Fig. 1. Fig. 5 is a cross-sectional elevation on the line 5 5, Fig. 1. Fig. 6 is an enlarged longitudinal sectional elevation on the line 6 6, Fig. 1. Fig. 7 is an enlarged cross-sectional elevation on the line 7 7, Fig. 6. Fig. 8 is a detail view of parts hereinafter referred to, illustrating a different adjustment of the machine.

In the reduction to practice thus illustrated I employ as means for hemming the continuous waistband-strip A, Fig. 1, and for attaching the tabs (in this instance loops B) thereto, an ordinary two-needle sewing-machine, of which the needles C and presser-foot C′ are indicated, having an ordinary hemfolding

attachment D, through which the strip A is led from a suitable strip-supply bobbin or roll and by which it is hemfolded, as indicated by A′. To advance or feed the strip A intermittently through the hemfolder D and beneath the needles C between successive descents of the needles, so as to form the hem and the hemstitching, I prefer to employ in lieu of the ordinary reciprocating feed-claw, which is hardly positive enough, a pair of intermittently and positively actuated feed-rolls C^2 beyond and in line with the sewing mechanism, between which rolls the strip A is passed, the rolls being by preference longitudinally corrugated to better grip the strip. To rotate the feed-rolls C^2 intermittently in unison with but between the descents of the needles C, so as to form the hemstitches C^{14}, I mount the shafts C^3 of the rolls C^2 in bearings C^4 C^5, connect the shafts by spur-gears C^6, and on the upper-roll shaft C^3 fix a ratchet-wheel C^7, which is intermittently rotated by a pawl C^8 on a pawl-carrying lever C^9, pivoted to the outer bearing C^5. The pawl-carrying lever C^9 is connected to a rod C^{10}, which is strapped to an eccentric C^{11}, fixed on a shaft T, which is geared to revolve in unison with the needle-actuating shaft U of the sewing-machine, as hereinafter described, so that the feed-rolls C^2 will advance the strip A step by step, so as to form the hem and stitches as desired.

To vary the length of the individual hemstitches, I connect the pawl-carrier C^9 adjustably to the eccentric-rod C^{10} by means of the pin-and-slot connection shown in Fig. 5, so as to alter the stroke of the pawl and thus the length of each intermittent movement of the feed-rolls C^2 at will.

To permit the introduction, passage, and removal of the strip A with the loops B between the feed-rolls C^2, I mount the roll-shafts C^3 in the bearings C^4 C^5 at one end only, leaving the other ends of the rolls free to spring slightly apart, and the shaft C^3 of the upper roll C^2 free to work vertically in a slot in the bearing C^4. To facilitate the separation of the rolls C^2 for this purpose, I pivot on the upper-roll shaft C^3 a handled cam-lever C^{12}, which can be swung so as to act against the lower shaft, and thus raise the upper roll C^2 from the lower roll.

Heretofore the ends of the buttonhole tabs or loops B have been inserted by hand within the open hemfold A′ between the hemfolder D and the presser-foot C′, the proper points for the loops being previously marked on the strip A, and the stitching C^{14} thus secured the hemfold A′ and simultaneously the ends of the loops B within the hem.

To deliver the tabs or loops B automatically and continuously to the advancing strip A at the proper points on the strip and their ends beneath the open hemfold A′ between the hemfolder D and the sewing-needles C, I employ by preference the following mechanism: On a stationary horizontal frame E on a short vertical shaft F, I mount revolubly a horizontal carrier G, consisting of a flat disk, which is revolved immediately above the cloth-plate H of the sewing-machine and the strip A, moving thereon tangentially to the inner edge of the hem A′ in line with the needles C. The rotary carrier G is provided around its periphery with radial-bottomed outwardly-opening loop-holding pockets I, which are separated, peripherally, by spaces equal and corresponding to the desired spaces between the tabs or loops on the strip A, as before described.

The carrier G is revolved, by mechanism to be described, with an intermittent motion and at a peripheral speed equal to that of the feed of the strip A, and the pockets I are so constructed that the heads of the loops B, being placed successively therein, as hereinafter described, the loops B will be held therein until they successively reach the strip A, when the ends of the loops projecting from the ends of the pockets I will be delivered, successively, into the open hemfold A′ between the hemfolder D and the needles C. Then as the hemfold with the inserted loop ends passes beneath the presser-foot C′ the hemfold and the inclosed loop ends are simultaneously stitched to the body of the strip A by the sewing-needles C in the manner previously described as heretofore performed by hand, and as the attached loops or tabs pass the needles C the loops or tabs are drawn by the advancing strip from the pockets I. The loops are thus automatically and continuously delivered and attached to the strip at the intervals desired for cutting up into individual waistbands.

I keep the ends of the loops B, projecting from the carrier G, from bending backward as they enter the open hemfold A′ by employing a spring-pressed arm J, pivoted on the carrier G at each pocket I and normally bearing forward, peripherally, against the rear side of the pocket I and the projecting ends of the loop, which bearing-arm J, when it strikes the side of the presser-foot C′, is thrown rearward and inward thereby out of the way of the hem and needles as the hem and loop are stitched to the strip A.

I do not herein claim, broadly, all forms of yielding fingers or arms for supporting the protruding end of the tab, but only such as are laterally yielding in their action.

I effect the intermittent rotation of the carrier G in peripheral correspondence with the forward motion of the strip A by fixing to the under side of the carrier a concentric spur-wheel K, revolving on the same shaft F, which spur-wheel K is revolved by a smaller spur-wheel L, which in turn is revolved by a pinion M, fixed on a short vertical shaft N. The pinion M is connected to a ratchet-wheel O, fixed on the same shaft N, which ratchet-wheel is intermittently rotated by a pawl P, carried and reciprocated by a lever Q, pivoted on the shaft N and carrying a cam-fol-

lower R, which rides in and is reciprocated by the cam-groove of a cam S. The cam S is fixed on the shaft T, which is mounted in bearings T′ on the frame E, and is geared by spur-wheels S′ S^2 to the main shaft U of the sewing-machine. The gearing is so arranged that the shaft T revolves synchronously with the sewing-machine shaft U, and that the ratchet-wheel O is rotated one step with each stitch and forward step of the strip A, and the carrier G revolved thereby, peripherally, step by step with the strip A.

I use carriers G of different sizes and with differently-spaced pockets I for varying the spacing of the loops B on the waistbands of different sizes, and I provide for using such different carriers interchangeably on the machine illustrated as follows: I mount the carrier-shaft F in a flat sleeve 1, which slides and is adjustable to and from the line of the hem A′ in guides 2, fixed on the frame E, and is fixed in its adjustment by means of a clamp-plate 3. The carrier G and attached spur-wheel K, together with a cam 4, attached to the under side of the spur-wheel K, as and for the purpose hereinafter described, revolve together freely with the shaft F and can be removed therefrom and replaced by a carrier, spur-wheel, and cam of a different character by unscrewing a nut 5, screwing on the upper end of the shaft F. I likewise provide for adjusting the intermediate spur-wheel L horizontally, so as to gear with different sizes of spur-wheels substituted for the interchangeable spur-wheel K while remaining in gear with the pinion M, as follows: The intermediate spur-wheel L is mounted on one arm of an elbow-lever 7, which is pivoted to swing on the center of the shaft N, which shaft is mounted in an upright bearing 8 on a bracket 9, fixed adjustably to the frame E by a clamp-screw 10. The other arm of the elbow-lever 7 is provided with a clamp-screw 11, which rides in a segmental slot 12 of the bracket 9, concentric with the shaft N, so that by setting the screw 11 in the slot 12 the intermediate spur-wheel can be adjusted to gear with a spur-wheel K of any size while remaining in engagement with its actuating-pinion M.

For supplying the pockets I of the carrier G successively with tabs or loops B to be delived to the strip A, as described, I employ the following mechanism, which I mount on a horizontal frame 13, adjustable on the frame E toward and from the carrier G by means of slots 14 and clamp-screws 15, so as to suit carriers G of different sizes, as before described: I first make the loops by feeding a continuous cord intermittently in front of a loop-forming pocket, cutting off a section of the cord of a length sufficient to form one loop, and then by a plunger pushing the middle of said section into the loop-forming pocket, so as to double the cord-section and form the loop. I then transfer the loops in succession from the loop-forming pocket into the successive loop-holders or pockets I of the carrier G.

As the present machine is designed, as before stated, to deliver series of three elastic loops and five inelastic loops in alternation, I employ two independent cord-feeding devices, one for the elastic cord and the other for the inelastic cord. To feed the elastic cord, I employ geared upper and lower feed-wheels 16 and 17, respectively, by and between which the elastic cord is fed from a suitable supply-bobbin on a line running transversely across the mouth of a loop-forming pocket 19, which pocket is formed in an arm 20, normally held by a spring 21 against a stop 22, but pivoted to swing on a sleeve on the carrier-shaft F over the carrier G, and is arranged to register vertically with the pockets I of the carrier G in succession as the carrier revolves. From the cord-feeding wheels 16 and 17 the elastic cord is led through a guide-tube 23, the outlet 24 of which is at a distance from the normal axis of the loop-forming pocket 19 equal to half the length of the cord-section from which the loop is formed, and from the guide-outlet 24 the cord runs over a fixed table 25 across the mouth of the loop-forming pocket 19, the table 25 having a ledge 18 opening in front of the pocket 19. In like manner I feed the inelastic cord across the mouth of the same loop-forming pocket 19 by means of upper and lower feed-wheels 27 and 28, respectively, on the side of the loop-forming pocket 19 opposite the feed-wheels 16 and 17, but in line with the latter, and the inelastic cord is fed by the wheels 27 and 28 in the line of but in a direction opposite that of the elastic cord through a guide-tube 29, like but opposite the guide-tube 23, and over the table 25. The outlet 30 of the guide-tube 29 is the same distance from the loop-forming pocket 19 as the outlet 24 of the guide-tube 23 on the opposite side thereof. I cause the feed-rolls 16 and 17 to advance the elastic cord across the loop-forming pocket 19 the length of one loop-forming section—that is, from the guide-outlet 24 to the opposite guide-outlet 30—and then to stop while the cord-section is cut off and the loop is formed thereof, as hereinafter described, three times in succession as the respective pockets of the carrier G come under the loop-forming pocket 19, and I then cause the opposite feed-wheels 27 and 28 to feed the inelastic cord likewise intermittently five times in succession across the loop-forming pocket 19 while the feeding of the elastic cord is interrupted, and so on in alternation. This I accomplish as follows: The two upper feed-wheels 16 and 27 are fixed on parallel shafts 31 and 32, which are mounted to revolve in bearings 33 and 34, fixed on the adjustable frame 13. On the shafts 31 and 32 are fixed ratchet-wheels 35 and 36, whose ratchet-teeth face in opposite directions. The ratchet-wheels 35 and 36 are rotated, each intermittently, in oppo-

site directions by spring-pressed pawls 37 and 38, pivoted to and carried by levers 39 and 40, pivoted to rock on the shafts 31 and 32 as centers. The levers 39 and 40 carry rollers 41 and 42, which ride in slots 43 and 44 in and are reciprocated by levers 45 and 46, which are pivoted to bearings 47 and 48 on the frame 13. The lower ends of the levers 45 and 46 are connected by a link 49, so that said levers are compelled to swing in unison, and thus the upper feed-wheels 16 and 27 to be both operated thereby simultaneously, as one roller 41 is on the opposite side of its center 31 from its pawl 37 while the other roller 42 is on the same side of its center 32 as its pawl 38. The lever 46 also carries a cam-follower 50, which rides in and is actuated by a cam-groove in a cam 51, which is fixed on a shaft 52, mounted in bearings 53 on the frame 13, so that at each revolution of the shaft 52 the pawls 37 and 38 and the ratchet-wheels 35 and 36 are simultaneously moved in opposite directions the distance of one ratchet-tooth and the upper feed-wheels 16 and 27 thus simultaneously rotated in opposite directions the distance peripherally of one cord-section, the direction of rotation of both feed-wheels being such as to feed the cords toward each other and across the loop-forming pocket 19. I, however, cause each pair of feed-wheels 16 and 17 and 27 and 28 to actually advance its respective cord only when the opposite pair does not so advance its cord, and vice versa, by separating the lower feed-wheels from the upper feed-wheels alternately, as hereinafter described.

I effect a single rotation of the feed-wheel-actuating shaft 52 and then its cessation, as each pocket of the carrier G comes under the loop-forming pocket 19, as follows: On the shaft 52 I mount, by means of a feather and groove, a serrated clutch-disk 55, so that it must rotate with, but can slide lengthwise on, said shaft 52.

On the shaft 52 I also loosely mount a second serrated clutch-disk 56, with which the clutch-disk 55 can be locked or from which it can be disengaged by shifting it on the shaft 52.

The loose clutch-disk 56 is fast to a worm-wheel 57, also loosely mounted on the shaft 52, which worm-wheel is constantly geared to a worm 58, fixed on the shaft T (before described as geared to the sewing-machine) by means of a set-screw and feather and groove to admit of the adjustment of the loop-forming frame 13, before referred to. The shaft T, which has bearings T′ on the frame E, thus revolves the shaft 52 only when the clutch-disks 55 and 56 are locked together. To throw the clutch-disks into engagement, I provide the sliding clutch-disk 55 with a hub having a peripheral groove 60, in which rides a roller 61 on an elbow-lever 62. The lever 62 is pivoted on the frame 13 and has another arm 64, which is pivoted to the arm 65 of another elbow-lever 66, also pivoted to the frame 13 and having an arm 67, carrying a cam-follower 68, which is actuated by the cam 4, before referred to as fast to the under side of the carrier G and carrier-gear K, and by a spring K′, acting in opposition to said cam. The cam 4 has a peripheral cam depression 69 for and corresponding to each pocket I on the carrier G, which cam depression, through the levers 66 and 62 described, permits the spring K′ to throw the clutch-disks 55 and 56 into engagement and holds them therein, so as to cause a single rotation of the shaft 52, and thus a single progression of the upper cord-feeding wheels 16 and 27 as each pocket I of the carrier G comes under the loop-forming pocket 19, and after such single rotation of the shaft 52 the cam projection, following the depression 69, throws the clutch-disks 55 and 56 out of engagement, and thus stops the motion of the shaft 52.

To separate the lower gripping feed-wheels 17 and 28 alternately from the upper feed-wheels 16 and 27, and thus cause the opposite cords to be advanced three successive times and five successive times in alternation, as described, I employ the following mechanism: The lower feed-wheels 17 and 28 are mounted to rotate freely on opposite ends of a beam-lever 71, which is hung at its middle on a pivot-bearing 72 on the frame 13, so as to swing vertically in the plane of the upper feed-wheels 16 and 27. The adjustment is such that when one lower feed-wheel is swung into cord-gripping relation to its upper feed-wheel the opposite lower feed-wheel will be just out of cord-gripping relation to its upper feed-wheel, and vice versa. To thus swing the beam-lever 71 at the proper times, the beam-lever is provided on opposite ends with cam-followers 72 and 73, which respectively ride on and are alternately actuated by cams 74 and 75, fixed on a transverse shaft 76, mounted in bearings 81 on the frame 13, the bearing edges of said cams being so constructed that during three-eighths of one rotation of the cam-shaft 76 the lower elastic-cord feed-wheel 17 will be raised to grip and feed elastic cord and the opposite lower feed-wheel 28 will be lowered, and during the remaining five-eighths of the rotation of the cam-shaft 76 the lower feed-wheel 28 will be raised to feed the inelastic cord and the opposite lower feed-wheel be lowered. The cam-shaft 76 is rotated once therefore during each eight cord-feeding operations and during each complete rotation of the loop-carrier G as follows: On the cam-shaft 76 is fixed an eight-toothed ratchet-wheel 78, which is intermittently actuated by a pawl 79, carried by a lever 80, pivoted loosely on the shaft 76 as a center, the lever 80 being connected by a rod 81 to the bent end 82 of a longitudinally-reciprocating slide 83, which works in guides 84, fixed on the frame 13. The slide 83 carries a roller 85, which rides in and, together with the slide, is reciprocated by a slot 86 in the end of a lever 87, which is pivoted to a bearing 88, fixed on the frame 13, and carries a cam-follower 89, which rides on and

is actuated by the cam projection 90 of a cam 91, fixed on the intermittently-rotated transverse shaft 52. Thus each single revolution of the shaft 52 advances the eight-toothed ratchet-wheel 78 one tooth, and as a single revolution of the shaft 52 occurs as each pocket of the carrier G comes below the receiving-pocket 19 and as each such revolution feeds a cord-section formed as before described eight cord-sections—that is, three sections of elastic cord and five sections of inelastic cord—are fed forward in front of the receiving-pocket 19 successively during each revolution of the shaft 76 and of the carrier G. As and after the elastic and inelastic cord sections are thus successively advanced in front of the receiving-pockets 19 I sever such sections for forming the loops from the main cords as follows: I arrange knives 92 and 93 to reciprocate vertically across the outlets 24 and 30, respectively, of the elastic and inelastic cord feeding tubes 23 and 29 and fix said knives on levers 94, which are pivoted to bearings 96 on the frame 13, and carrying cam-followers 97, which ride on and are actuated by cam projections 98 on cams 99, fixed on the shaft 52, so that after each forward step of the cord-feeding rolls both knives 92 and 93 are reciprocated across the common path of the cords and the cord-section which has been advanced, either elastic or inelastic, is severed by the corresponding knife, the other knife of course finding nothing to cut. To form a loop of each of the elastic and inelastic cord sections thus placed midway in front of the receiving-pocket 19 and severed, I attach to the before-described reciprocating slide 83 a plunger 100 to work lengthwise in the receiving-pocket 19 and push the severed cord-section wholly therein from the middle, thus doubling the cord-section and forming the loop and at the same time temporarily fixing the loop in the pocket 19, this occurring and the plunger being then withdrawn by the slide 83 as each pocket I of the carrier G comes beneath the receiving-pocket 19. I prefer to make the plunger 100 T-shaped in cross-section, so that its thin web will enter the pocket 19 between the two limbs of the loop and its head will hold the loop down in the pocket 19.

To transfer each loop successively from the receiving-pocket 19, which is open at the bottom, to the registering carrier-pocket I, I pivot to the arm 20 of the receiving-pocket 19 a vertically-reciprocating hammer 101, whose head 102 is adapted to enter the open top of the receiving-pocket 19 after the withdrawal of the plunger 100 therefrom and push the loop downward into the carrier-pocket I beneath the same. To actuate the hammer 101 at the proper times, I fix upon the shaft 52 a cam 102, whose projection 103 actuates a cam-follower 104 on a vertically-acting lever 105, pivoted to the frame 13, the lever 105 having a laterally-extended arm 106, which depresses the hammer 101, and a spring 107 again raising the hammer for the succeeding loop transfer after the cam projection 103 has passed the cam-follower.

As the transfer of the loop from the pocket 19 to the carrier-pocket I consumes an appreciable time and the carrier G is rotating meanwhile step by step in unison with the stitching, I maintain the receiving-pocket 19 temporarily in register with each carrier-pocket I during the transfer as follows: The arm 20 of the receiving-pocket 19 is pivoted to swing horizontally on the carrier-shaft F, as before described. The arm 20 is provided with a lug 108, which is successively caught by a spring-held latch 109, pivoted on the carrier G at each carrier-pocket I, so that the pocket-arm 20 is carried with the carrier G until the loop-transfer is accomplished, when a cam end 110 of the latch 109 is engaged by a pin-tripper 111, fixed to the frame 13, and the latch thereby disengaged from the lug 108. The pocket-arm 20 is then swung back to its normal loop-forming position against the stop 22 by the spring 21, previously referred to. The carrier-pockets I being thus successively supplied with elastic and inelastic loops the same are delivered to, spaced on, and attached to the continuous strip A, as before described.

In Fig. 8 I have illustrated a modified adjustment of the cord-cutting, loop-forming, and loop-transfer cams, whereby the transfer of a loop previously formed is effected as each carrier-pocket comes under the receiving-pocket before the loop is formed for the succeeding pocket, which adjustment is sometimes to be preferred.

In the drawings I have shown all the carrier-pockets I and the corresponding cam depressions 69 equal distances apart, except those separated by the longer space shown to make the corresponding longer space between the third and fourth loops of each individual waistband. For some sizes of waistbands, however, I shall in like manner make a longer space between the last or eighth loop of each individual waistband and the first loop of the next waistband, where the continuous waistband is severed, so as to leave an extra space on the ends of the individual waistbands.

It is evident that the tabs or loops might be supplied to the carrier directly by hand instead of by automatic loop forming and transferring means, as described, or they might be placed by hand directly in the pocket 19 as a sort of initial receiver or supply device and then automatically transferred, as described, to the loop-carrier.

It is also evident that the waistband-strip might be hem-folded previously by means independent of the machine or the upper ply of the fold be a separate strip, as it is now sometimes made, in either of which cases the part here shown as a hem-folder would serve merely as means for keeping the upper ply

apart from the lower strip to permit the carrier to deliver the tabs therebetween prior to the attachment of the tabs.

I claim as my invention—

1. The combination of strip-feeding means, loop-tab-delivering means, loop-forming means, a plurality of cord-feeding means, and cord-cutting means, and means whereby the separate cord-feeding means are caused to operate at different times to supply sections of independent cords to the loop-forming means.

2. A rotary tab-carrier having a marginal pocket to hold the head of a loop, and a laterally-yielding bearing projecting alongside the pocket radially beyond the margin of the carrier to laterally support the protruding end of the tab.

3. A tab-carrier having a marginal loop-holding pocket and a yielding bearing projecting alongside the pocket beyond the margin of the carrier, and carrier-operating means, in combination with tab-attaching means having a part, as the presser-foot, of a sewing-machine, to retract said bearing.

4. The combination of strip-feeding means, a tab-delivering carrier having tab-holding pockets, its operating means, a pocket or receiver for initially holding the separate tabs, and a hammer and its operating means for transferring the separate tabs successively from said holding-pocket or receiver to the carrier-pockets.

5. The combination of a tab-delivering carrier having a series of tab-holding pockets, its operating means, a cam moving with the carrier having a series of grades at intervals corresponding to the carrier-pockets, and a tab-supplying device to place tabs in the carrier-pockets actuated by the successive grades of the cam.

6. The combination of a tab-delivering carrier having tab-holding pockets, its operating means, a loop-forming pocket and plunger and plunger-operating means, and means for transferring the loops from the forming-pocket to the pockets in the carrier.

7. The combination of a loop-forming pocket and means for transferring the loops therefrom, a loop-forming plunger, means for feeding cord intermittently between the plunger and pocket, cord-cutting means, and plunger-operating means.

8. The combination of a loop-forming pocket and means for transferring the loops therefrom, a loop-forming plunger, means for feeding at different times independent cords from opposite sides between the plunger and pocket, cord-cutting means, and plunger-operating means.

9. The combination of a tab-delivering carrier having tab-holding pockets, its operating means, a loop-forming means, a loop-transferring means for transferring the loops from the loop-forming means to the carrier, and means for moving the loop-transferring means in harmony with the movement of the tab-delivering carrier.

In testimony whereof I have hereunto set my hand the 27th day of February, 1897.

HERBERT E. HAWES.

In presence of—

CLARENCE L. BURGER,
FRANK THORN.