

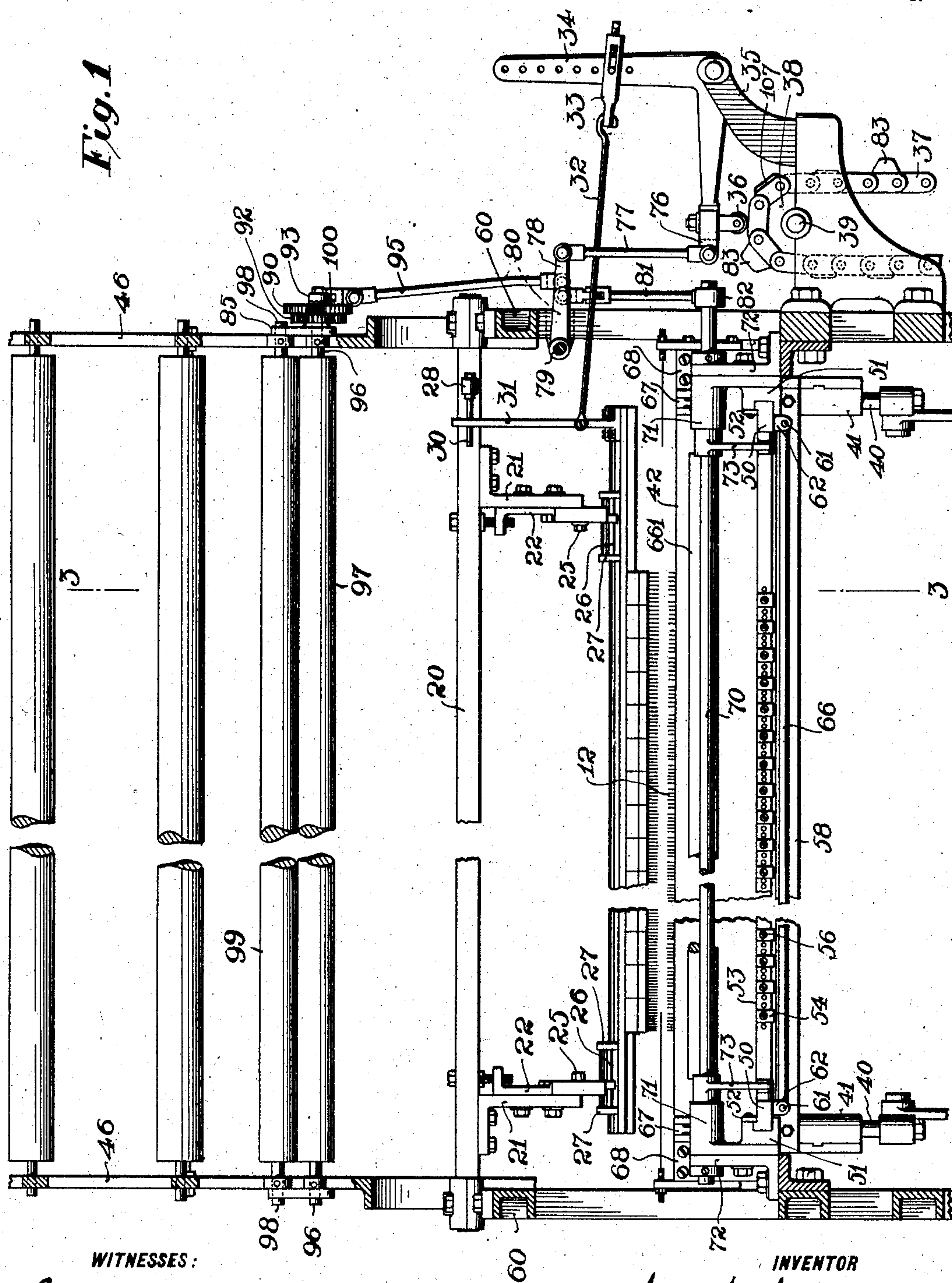
No. 781,387.

PATENTED JAN. 31, 1905.

M. N. AARON.
MACHINE FOR MAKING LACE TRIMMINGS.

APPLICATION FILED NOV. 7, 1904.

3 SHEETS—SHEET 1.



WITNESSES:

M. M. Hamilton
J. B. Wood

INVENTOR

Max A. Aaron

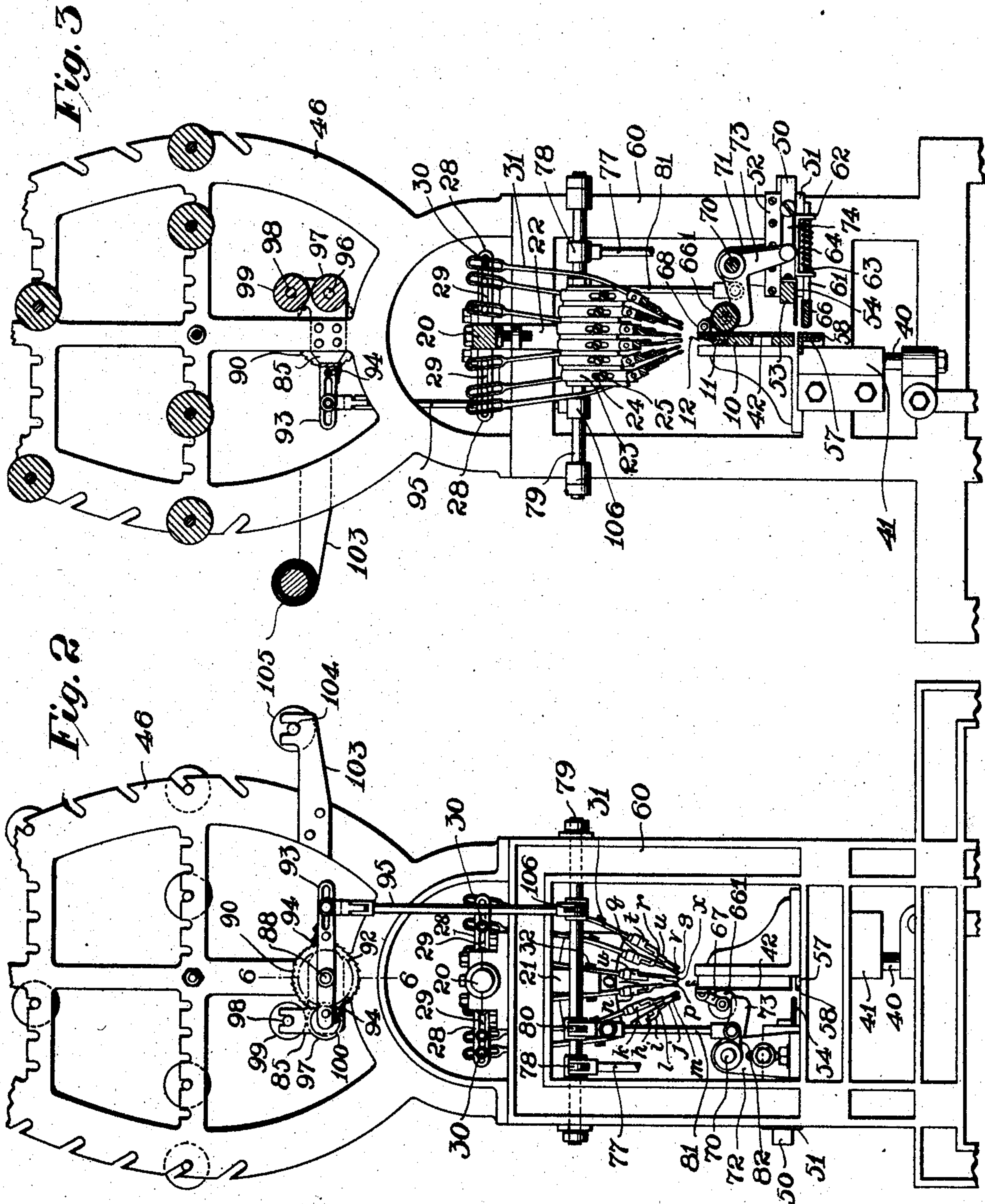
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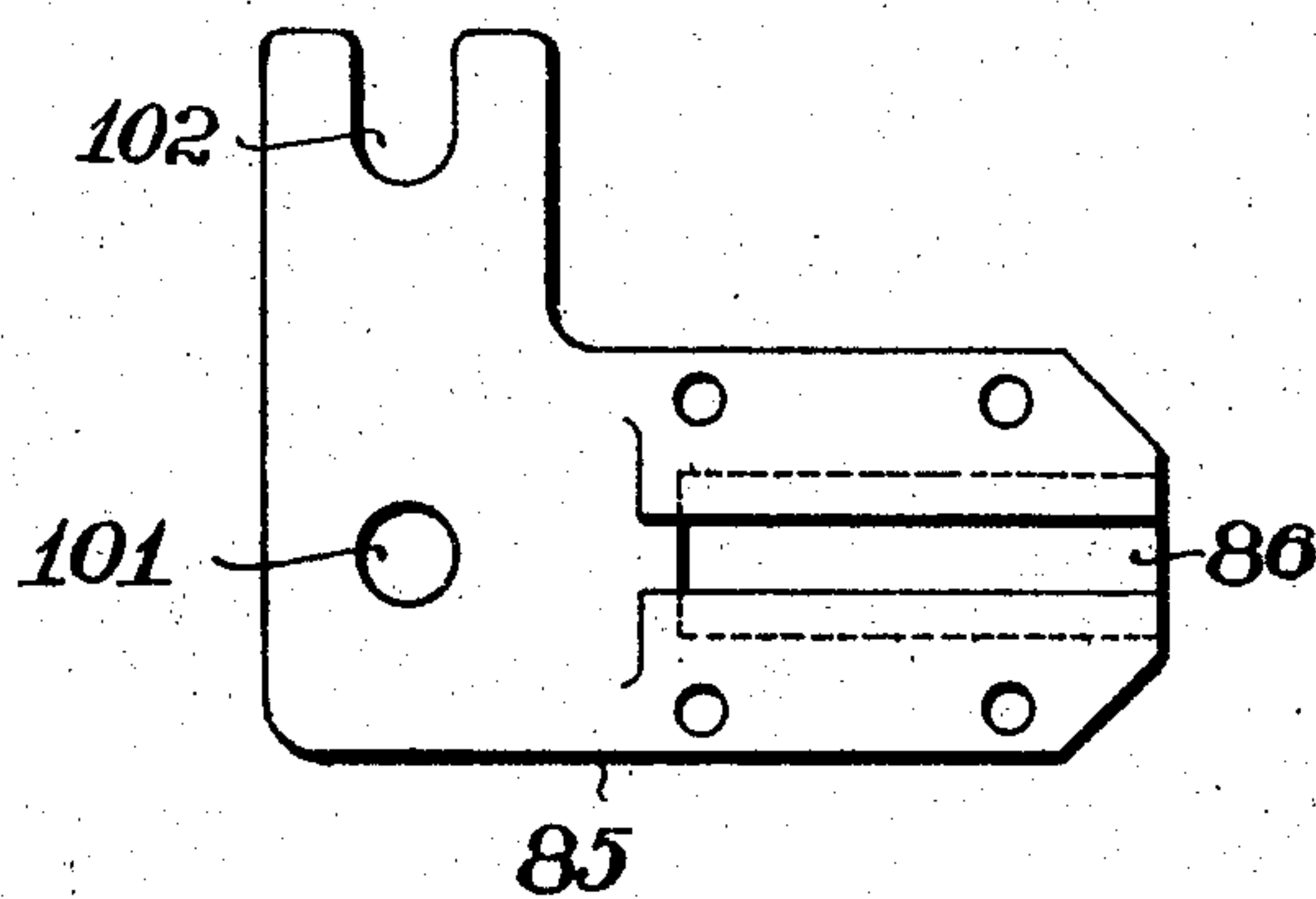
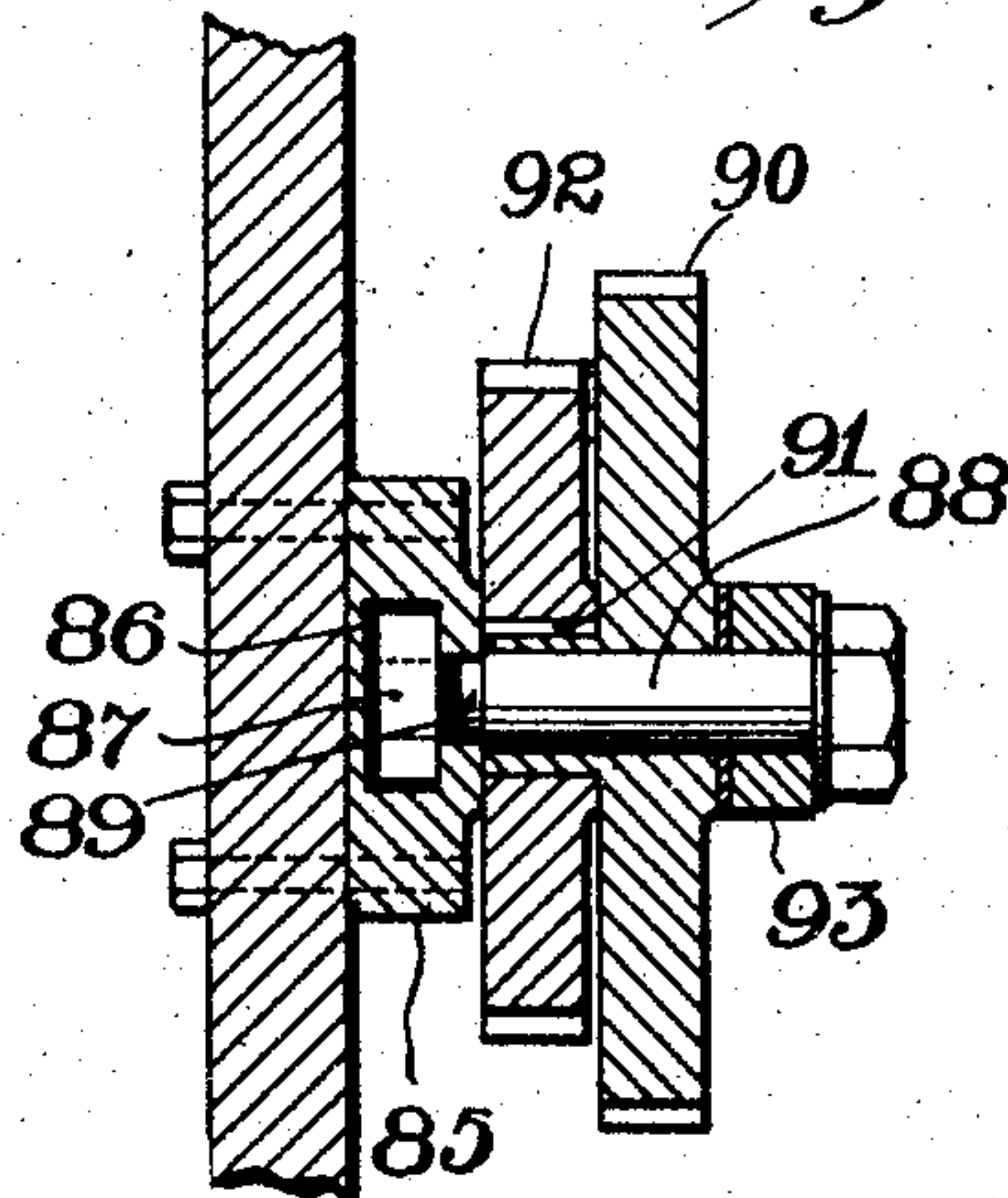
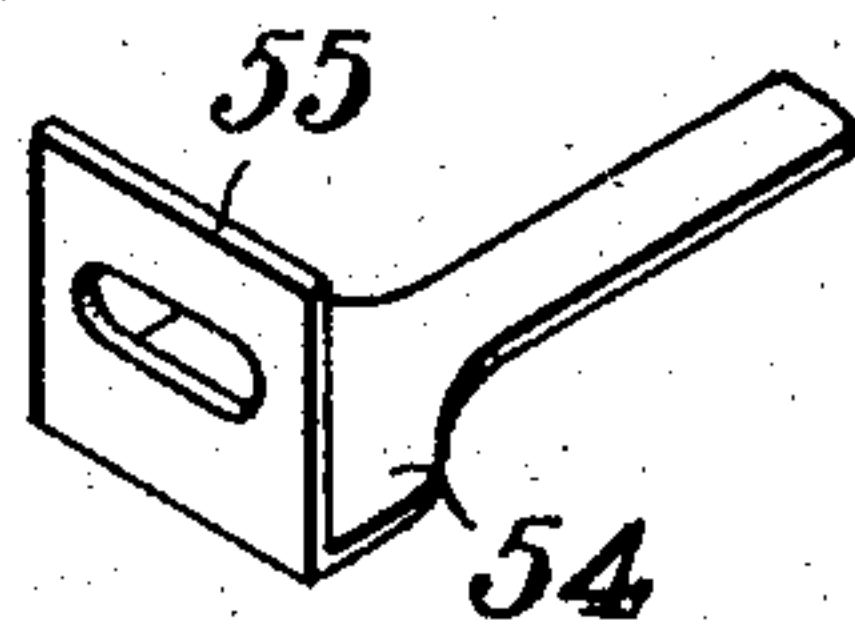
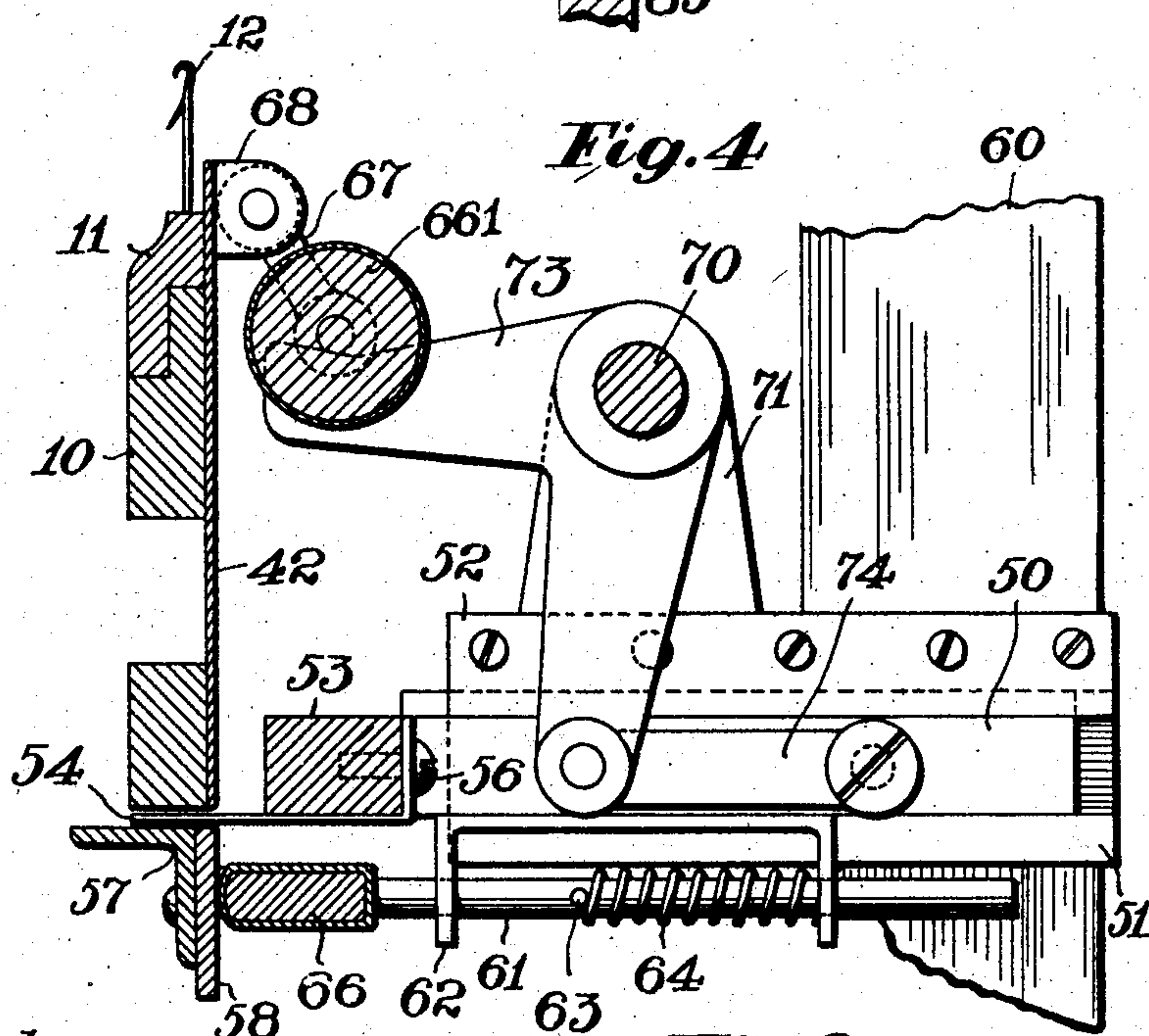
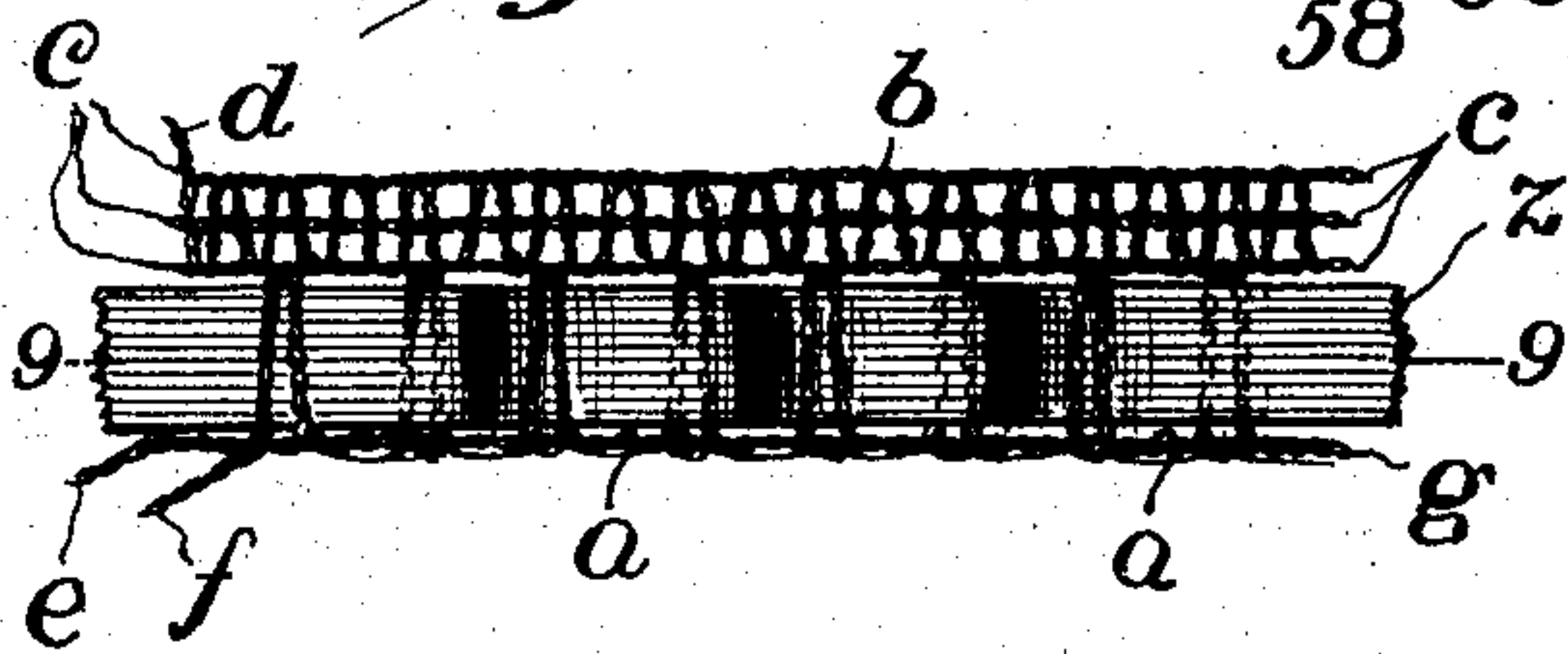
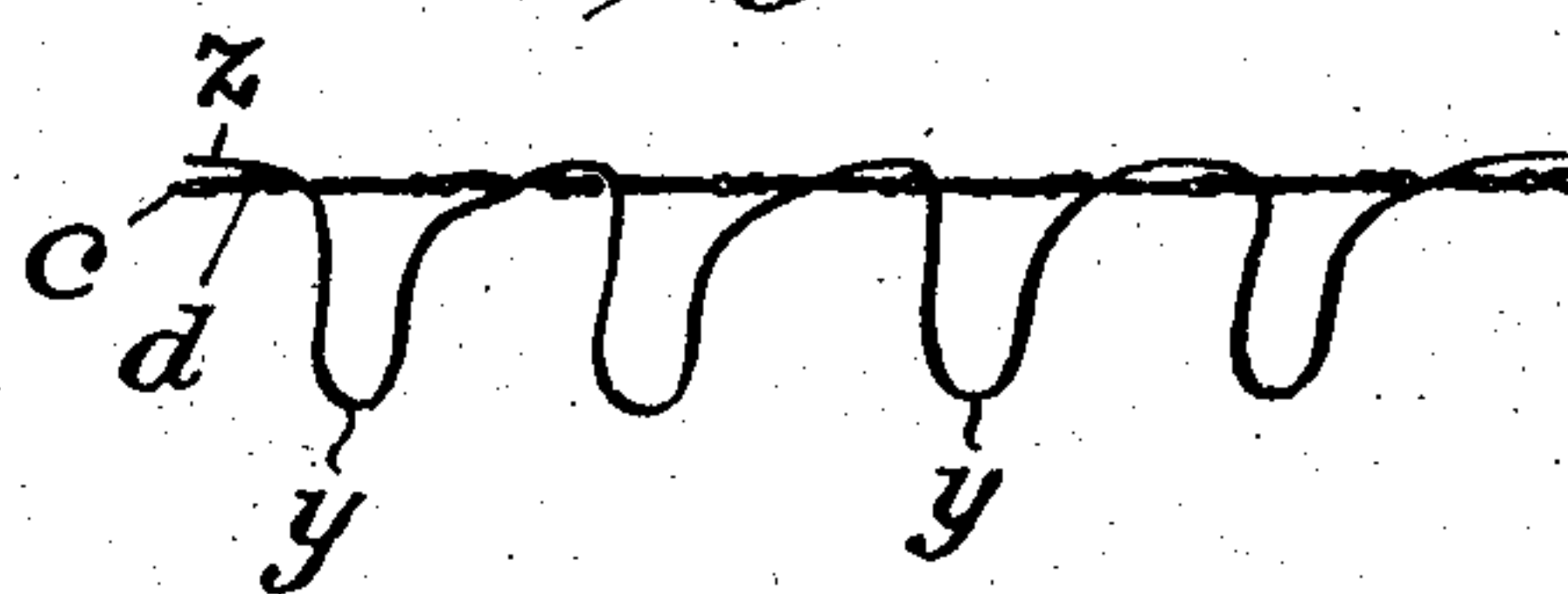
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3 SHEETS—SHEET 3.

Fig. 5*Fig. 6**Fig. 7**Fig. 4**Fig. 8**Fig. 9*

WITNESSES:

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UNITED STATES PATENT OFFICE.

MAX N. AARON, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR MAKING LACE TRIMMINGS.

SPECIFICATION forming part of Letters Patent No. 781,387, dated January 31, 1905.

Application filed November 7, 1904. Serial No. 231,660.

To all whom it may concern:

Be it known that I, MAX N. AARON, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Machines for Making Lace Trimmings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to machines for making lace trimmings, and is an improvement on or addition to the machine set forth and claimed in an application filed by me July 23, 1904, Serial No. 217,774. This prior application sets forth a machine which is adapted to insert a ribbon automatically in the ribbon-space of the fabric in the process of knitting the fabric. A typical trimming of the character which the machine of said application is designed to make consists of a heading composed (usually) of three longitudinal threads crossed by a number of transverse threads and a ribbon-space formed between one of these longitudinal threads and another longitudinal thread connected together by transverse pillar-bars. The ribbon or braid is inserted in this space by passing it longitudinally in front of and back of alternate bars. While the machine of my prior application is operative to make a fabric of this kind and insert the ribbon automatically in the process of knitting, no means are disclosed therein to form loops in the ribbon at determinate distances along the trimming. It is frequently desirable to sell the lace trimming with the ribbon so looped. To do this is the object of my present invention, which consists in additions to or modifications of the machine of my prior application adapted to effect this object.

The invention also has for its object to feed the ribbon positively toward the point of knitting.

Figure 1 is a rear view of the machine, partly in section. Fig. 2 is an end view of the machine with some of the parts removed. Fig. 3 is a section on the line 3 3 of Fig. 1. Fig. 4 is an enlarged view of a portion of the mechanism shown in Fig. 3 with the parts in a different position. Fig. 5 is a detail view

in elevation of the support for the feed mechanism. Fig. 6 is a section on the line 6 6 of Fig. 2. Fig. 7 is a perspective view of the looping-finger. Fig. 8 is a front view of a fabric made on a machine embodying my invention, and Fig. 9 is a section on the line 9 9 of Fig. 8.

I shall not describe with particularity the construction or operation of the machine in its entirety, as the said machine is in its main features a well-known type of what is known in the art as a "rib-lace" machine, and the means enabling the ribbon to be automatically inserted in the process of knitting the fabric are fully set forth in my prior application. I shall, however, refer to its main features and shall for a better understanding of the present invention particularly describe the machine of my prior application, as well as the novel features that distinguish my present invention therefrom. It will, however, be understood that my invention is not limited in its application to the particular type of machine shown, which is merely a type of machine to which I have already applied my invention and in connection with which I prefer to use my invention. I shall also limit the description to such of the mechanism as is essential to produce the typical ribbon-containing lace trimming shown in Figs. 8 and 9, although the invention is equally applicable to ribbon-containing fabrics of a different construction.

The fabric shown in Figs. 8 and 9 consists of the ribbon-space *a* and the heading or selvage *b*. The heading consists of the three longitudinal threads *c* and the transverse threads *d*. The ribbon-space is formed by the longitudinal thread *g* and the threads *e* and *f*, the latter each being twisted along the thread *g* and also extending transversely back and forth between threads *g* and *c* and looped on the latter, the threads *e* and *f* thereby forming double transverse pillar-bars alternating with each other and spanning the space between threads *g* and *c*. The inner thread *e* of the heading may also be said to constitute the inner thread of the ribbon-space, being, in effect, the dividing-thread between the ribbon-space and heading. The ribbon *z* is in-

serted in this space, being held in place by extending in front of each bar formed by thread *e* and back of each bar formed by thread *f*, or, in other words, extending in front of and
 5 back of alternate bars. At determined distances along the trimming the ribbon is drawn outwardly beyond the plane of the fabric to form loops *y*, these loops being shown in Fig. 9 as being formed between alternate cross-
 10 bars, although they may be formed at any suitable distances apart. After the trimming is placed upon a garment, such as ladies' underwear, and the garment put on the ribbon is drawn more or less tightly through the
 15 trimming for the purpose of adjusting the garment to the wearer, and the excess length of ribbon so produced may be formed by the wearer into an ornamental bow or tie. The machine embodying my invention is adapted
 20 to insert the ribbon and form the loops therein in the process of knitting the trimming.

The fabric referred to is only one of numerous fabrics having interwoven therein a ribbon or braid, and such fabric is to be con-
 25 sidered merely as illustrative and as an aid to an understanding of my invention and not as representing the only style of fabric to the manufacture of which my invention is applicable, my invention, in fact, being applicable
 30 to the manufacture of any lace or kitted fabric containing a ribbon or braid. In the production of this fabric a series of guide-bars are employed, each of which, except one, carries a series of thread-guides and one of which
 35 carries a series of ribbon-guides, all of the bars being adapted to oscillate back and forth and some of the bars being adapted to be given a longitudinal movement and all of the guides coöperating with the usual vertically-recipro-
 40 cating needle-bars carrying the needles.

h is the rear guide-bar, to which are fastened the plates *i*, carrying the guides *j*, said guides holding in position the longitudinal threads *c* of the heading. These bars are sub-
 45 stantially stationary so far as longitudinal movement is concerned. *k* is the next adjoining guide-bar, to which are fastened plates *l*, carrying the guides *m*, said guides governing the position of the transverse thread *d*.
 50 These bars are adapted to have a regular longitudinal reciprocating movement, so as to direct the thread *d* back and forth between the outer and inner threads *c c* of the heading to form the transverse bars thereof. *n* is the
 55 next adjoining guide-bar, to which are fastened the plates *o*, carrying the guides *p*, said guides governing the position of the thread *e* and being given an intermittent longitudinal reciprocating movement to form alternate
 60 cross-bars spanning the ribbon-space between the inner thread *c* of the heading and the thread *g*. *q* is the next adjoining guide-bar but one, to which are fastened the plates *r*, carrying the guides *s*, said guides governing
 65 the position of the thread *f* and being given

an intermittent longitudinal reciprocating movement (alternating with the similar movement given to the guides *p*) to form alternate cross-bars spanning the ribbon-space between the inner thread *c* of the heading and the
 70 thread *g*. *t* is the front and next adjoining guide-bar, to which are fastened the plates *u*, carrying the guides *v*, said guides holding in position the outer longitudinal thread *g* of the ribbon-space. These bars are substan-
 75 tially stationary so far as longitudinal movement is concerned.

Between the guide-bars *n* and *q* is a guide-bar *w*, said guide-bar having secured thereto a bracket or ribbon guide *x*, having a should-
 80 dered or enlarged lower end containing a wide but shallow orifice whose dimensions permit the insertion therein and passage therethrough of the ribbon *z*, the specific construction of this ribbon-guide being more fully set forth
 85 in my prior application. The guide-bar *w* has no longitudinal movement.

10 is the usual needle-bar, to which are secured the plates 11, carrying the needles 12. The particular arrangement of the needles
 90 with relation to each other and to the guides need not be herein particularly described, as the same is fully set forth in my prior application and an understanding thereof is not
 95 necessary to an understanding of my present invention. It is sufficient to say that a set of needles is provided to coöperate with the set of guides described and that a vacant space is provided between needles, which space is lo-
 100 cated under the ribbon-guide *x* and is adapted to allow the passage therethrough of the ribbon as it is fed forward in the operation of the machine in the manner hereinafter de-
 scribed.

It will be understood that each guide-bar
 105 contains a series of guides extending throughout its length and that the needle-bar contains a corresponding series of needles, so as to permit the simultaneous making of a number of
 110 distinct sections of fabric. It will also be understood that only such guides of each guide-bar are at any given time in active use as are necessary to guide the threads which its
 115 guide-bar is designed to control. It will also be understood that as the several sections of fabric are spaced apart during manufacture a certain number of the needles are idle. It will
 be understood that there are as many active sets of guides and as many active sets of needles as there are sections of fabric to be simul-
 120 taneously produced.

20 is a shaft having bearings in the machine-frame 60.

21 represents brackets depending from shaft 20.

22 represents supports secured to brackets 21.

23 is a series of guide-bar holders, one for each guide-bar, said holders being slotted at 24 to receive a bolt 25, engaging the support
 130

22, whereby the guide-bar holders are adjustably supported on the support 22. Extending loosely through an orifice in the lower end of each holder 24 is a rod 26, fastened at its end in lugs 27, secured to the corresponding guide-bar. This permits each guide-bar to be moved in the direction of its length relatively to its corresponding holder 24.

To hold the guide-bars in definite position, a cross-head 28 is secured to the shaft 20. This cross-head is slotted at 29, and in said slot are a plurality of adjustable bolts 30.

31 represents levers secured at their lower ends to the several guide-bars, respectively, while their slotted upper ends engage, respectively, the bolts 30. Secured to each lever 31 is one end of a connecting-link 32, the other end of which is hooked into the orificed end of a bar 33, adjustably secured to one arm of a bell-crank lever 34, pivoted on a bracket 35 on the machine-frame. The other arm of the bell-crank 34 carries a roller 36, engaging a pattern-chain 37, extending around a pattern-wheel 38 on the shaft 39.

The shaft 20 is oscillated by the usual means, (not herein shown,) thereby imparting the usual oscillatory movement to the guide-bars. The pattern-shaft 39 is given a step-by-step rotary movement by the usual means, (not herein shown,) thereby feeding the several pattern-chains 37 and rocking the bell-cranks 34, and consequently giving the appropriate longitudinal movement to the guide-bars with which said bell-cranks are respectively connected. Such of the hooked levers 32 as are connected to the guide-bars to which no longitudinal movement is to be imparted may be disconnected from their respective bell-cranks, or the corresponding bell-cranks and pattern-chains may be removed or omitted. While the ribbon-guide bar *w* is shown supported from the shaft 20 in the same manner as the other guide-bars, it is obvious that the particular way in which it is supported is not material.

The needle-bar 10 is secured in the usual manner to rod 40, which extends down through guides 41, secured to the machine. The rod 40 is given a vertically-reciprocating movement by the usual means. (Not shown.)

42 is a stationary plate extending longitudinally back of the needle-bar and along the face of which the needle-bar slides.

The machine, so far as hereinbefore described, is the same as that set forth in my prior application. By reference thereto the operation of the foregoing parts will be fully understood. The space provided between two of the needles of each set permits the ribbon to feed within said space and to be guided between the thread *g* of the ribbon-space and the inner thread *c* of the heading without interference with the needles or with the said threads. The location of the ribbon-guide bar *w* between the guide-bar *n* for the thread *e*

and the guide-bar *q* for the thread *f* insures the ribbon feeding in front of the transverse bars formed by the thread *e* and back of the transverse bars formed by the thread *f*, thereby causing the ribbon to be drawn or fed through the ribbon-space alternately in front of and back of successive transverse bars of the ribbon-space in the course of manufacture of the fabric.

I will now particularly describe the novel features of the machine embodying the invention forming the subject-matter of my present application. I will first refer to Fig. 4, this figure showing in detail the mechanism which directly acts on the ribbon for effecting the looping operation.

50 is a slide on each side of the machine, said slide being adapted to work back and forth toward and from the needle-bar. 51 is a guide within which the outer end of the slide moves. This guide consists of a side member, against which the outer end of the slide fits, and an upper and lower member, respectively, partially overlying and underlying the slide. 52 is a guide-plate secured to the inner end of the overhanging member of the guide 51, said plate extending a short distance below the lower surface of the overhanging member of the guide 51 and extending in front of the outer portion of the slide, which portion extends somewhat above the remainder of the slide. Thus the slide is prevented from being dislodged from its guideway, while full freedom of movement back and forth is permitted. 53 is a slide-bar extending the width of the machine and secured at its ends to the slides 50. 54 is a forwardly-extending looping-finger (shown in detail in Fig. 7) having a slotted rear member 55, secured to the slide-bar 53 by means of a screw 56 in the slide-bar. This looping-finger is of about the width of the ribbon *z*. It has a limited adjustment along the slide-bar 53 by means of said screw and slot, so that it may be adjusted in line with the ribbon *z*. It will be understood that there are as many of these looping-fingers as there are sections of trimming being woven. The slide is provided with a large number of holes in excess of the maximum number of looping-fingers that will at any time be used, so that the latter may be adjusted along the slide-bar at any desired precise points. The slides, slide-bar, and looping-finger are normally in the position shown in Figs. 2 and 3—namely, the forward end of the looping-finger is a short distance back of the needle-plate 42. 57 is an angle-iron secured to the machine-frame at each side thereof, and 58 is an abutment-plate secured to the angle-irons. This abutment-plate is directly beneath the needle-plate 42, a slight space being left between the two plates to permit the ready passage between them of the looping-fingers 54. As the fabric is being woven it is fed down back of the needle-plate 42 and

abutment-plate 58. At predetermined intervals and by mechanism to be hereinafter described the slides are moved forwardly a sufficient distance to cause the looping-fingers to pass between the said plates, as shown in Fig. 4, and between the threads *c* and *g* of the trimming, engaging the ribbon and pulling it through to form the loop *y*, as shown in Fig. 9.

It is evident that provision must be made to compel the loop to be formed by pulling the ribbon from above, as if it were pulled from below it would result in pulling in and destroying previously-formed loops. To prevent, therefore, any upward movement of the ribbon during the operation of the looping-fingers, I have provided the following mechanism for directly acting upon the ribbon for the purpose of holding in position during the formation of a loop the loops previously formed: 66 is a clamping-bar secured at each end to a rod 61, which extends through orifices in the front and rear legs of a bracket 62, secured to and beneath the slide 50. 63 is a pin or stop on the rod 61. 64 is a spring confined between the pin 63 and the rear leg of the bracket 62. The clamping-bar is normally in the position shown in Fig. 3—namely, the forward end of the clamping-bar is a short distance back of the abutment-plate 58 and preferably slightly in front of the front end of the slide-bar 53. As the slide-bar 53 is moved forwardly, as before described, the clamping-bar 66 is also moved forwardly until it abuts against the trimming-back of the abutment-plate 58. Thereafter during the passage of the looping-fingers between the plates 58 and 42 the rear leg of the bracket 62 compresses the spring 64, causing the latter to press the clamping-bar forwardly with a strength dependent on the tension of the spring, confining the trimming tightly between the clamping-bar and the abutment-plate, and consequently holding the ribbon from movement.

From the foregoing description it will be apparent that the length of ribbon required to form a loop must necessarily be formed by drawing the ribbon downward from its source of supply and that there is no danger of drawing in and destroying a loop that is once formed. It is also advisable, while the looping-fingers are inoperative, to prevent the tension on the trimming exerted by the guide-bars in their oscillation back and forth from drawing up the ribbon and partially or wholly drawing in the previously-formed loops. To this end I provide a holding device or friction-roller 661, extending across the machine-back of the upper portion of the needle-plate 42, said friction-roller being hung on levers 67, pivoted on brackets 68, secured to the upper end of the needle-plate and normally by its weight pressing against the trimming, as it is formed, with sufficient force to prevent the ribbon from being pulled up-

wardly. The pressure of this friction-roller, however, need not be sufficient to prevent the ribbon being fed forward with the trimming, as the latter is formed by means of the usual take-up roll. It is necessary, however, that this roller should be retracted during the operation of the looping-fingers, as otherwise the action of the latter in pulling down the ribbon would be interfered with by the pressure of the roller. To effect this purpose, I provide the following mechanism: 70 is a shaft extending across the loom and turning at each end in a bearing formed in a bracket 71, which also supports the guide 51 previously described and which is itself supported on a standard 72, secured to the machine-frame. The shaft 70 is intermittently operated by mechanism hereinafter described. Secured to the shaft at each side of the machine is a bell-crank lever 73, one arm of which is connected through a link 74 with the slide 50. The other arm of each bell-crank extends immediately under the axle of the corresponding friction-roller 661. As the shaft 70 is turned on its axis, so as to move the bell-cranks from the position shown in Figs. 2 and 3 to that shown in Fig. 4, the slides 50 are moved forwardly to operate the looping-fingers 54 and clamping-bar 66, as before described, and at the same time the roller 661 is lifted away from its operative position into the position shown in Fig. 4, thereby permitting the ribbon to freely feed downwardly under the pulling action of the looping-fingers. As the shaft 70 is returned to its normal position the slides 50 are retracted, withdrawing the looping-fingers 54 and clamping-bar 66, and the roller 661 is permitted to again drop into operative position.

In place of employing the friction-roller 661 to prevent the pulling up of the ribbon in the trimming previously formed and looped I may utilize the clamping-bar 66 for the purpose. It will be understood that in all machines for making lace trimming a pawl-and-ratchet mechanism (not shown) is employed to operate a take-up roll, (not shown,) whereby the trimming after each course of knitting is fed forwardly. During the operation of the take-up roll the clamp 66 must of course be in its retracted position, as shown in Figs. 2 and 3, so as not to interfere with the intermittent feeding forward of the trimming. Moreover, there is no necessity during the operation of the take-up roll for providing any special means to prevent the ribbon being pulled up by the guide-bars, as the stronger downward pull exerted by the take-up roll effectually prevents this. The necessity for providing this special means exists, therefore, only while the take-up roll is inactive. It will be understood, therefore, that if the clamping-bar is moved forwardly, so as to press the trimming against the abutment-plate 58 during the time that the take-up roll

is inactive, the ribbon will at all times be held from upward movement. I therefore cause the slide 50 to move forwardly after each course of knitting and while the take-up roll is inactive a sufficient distance to carry the clamping-bar 66 against the trimming, but not sufficiently far to cause the looping-fingers to operate, except at such intervals as it is desired that the looping-fingers shall operate.

It will be understood that both the clamping-bar 66 and the friction-roller 661 may be employed to prevent the ribbon from being pulled upwardly or the friction-roller 661 may be employed, and the clamping-bar may be thrown into action only during the operation of the looping-fingers, or the clamping-bar may be thrown into action after each operation of the take-up roll and the friction-roller 661 omitted.

I shall now describe the mechanism for intermittently turning the shaft 70. I have hereinbefore stated that pattern-chains 37, extending around a pattern-wheel 38 on the shaft 39, engage rollers 36 on bell-crank levers 34 for the purpose of giving the appropriate longitudinal movement to the guide-bars with which said bell-cranks are respectively connected. I select one of the bell-crank levers 34 not connected with a guide-bar for the purpose of actuating the shaft 70. To the end of the roller-carrying arm of such bell-crank is secured an arm 76.

79 is a shaft turning in bearings in the machine-frame.

78 is a lever secured to shaft 79.

77 is a connecting-rod between the outer end of lever 78 and the end of arm 76.

80 is a lever secured to the shaft 79.

82 is a lever secured to shaft 70.

81 is a link connected to the outer ends of levers 80 and 82.

The particular pattern-chain 37 which engages the bell-crank that actuates the foregoing chains of mechanism is provided at suitable distances apart with high lugs 83. When a lug 83 passes under and elevates the end of said bell-crank, the chain of mechanism just described turns the shaft 70 to the extent necessary to move into action the looping-fingers and the clamping-bar and withdraw from operative position the friction-roller. When the lug 83 passes from under said bell-crank, the latter drops, restoring shaft 70 to its normal position, withdrawing the looping-fingers and clamping-bar, and permitting the friction-roller to again drop into operative position. When it is desired to bring the clamping-bar into operation after each action of the take-up roll, as well as during the operation of the looping-fingers, I provide the pattern-chain with low lugs 107, as well as high lugs 83. When a low lug is moved under said bell-crank, the chain of mechanism leading to the slide 50 is operated and the slide is moved forward sufficiently far to move the clamping-

bar into action, but not sufficiently far to cause the looping-fingers to operate.

It is desirable to provide positive means for feeding the ribbon from its spool or beam as fast as is necessary to supply the length required in the trimming as it is made and in the loops as they are formed, thereby delivering the ribbon freely without subjecting it to tension. To this end the following mechanism is provided: 85 is a bracket (shown separately in Fig. 5) secured to the beam-stand 46. This bracket is provided with a T-slot 86, containing a nut 87, (see Fig. 6,) which fits therein neatly, so as to be incapable of turning therein. 88 is a bolt having a reduced end 89 adapted to engage the nut. Loose on the bolt 88 is a ratchet-wheel 90, the hub of which is provided with a key 91. 92 is a gear-wheel having a keyway. By means of this key and keyway the gear 92 is secured to the ratchet-wheel 90, so as to turn therewith. 93 is a lever pivoted between its ends on bolt 88. By screwing up the bolt 88 the nut is drawn toward the outer wall of the slot 86, and the shoulder formed at the beginning of the reduced portion of bolt 88 engages the outer face of the bracket 85, thereby securely fastening the ratchet 90, gear 92, and lever 93 in position. 94 94 are pawls pivoted to lever 93 on each side of the ratchet 90 and adapted to turn the ratchet at each reciprocation of lever 93. The lever 93 is operated by connecting one end thereof with the lever 106 on the shaft 79 by means of the link 95. 96 is a shaft extending across the machine and turning in bearings in the beam-stand. The shaft 96 also extends through an orifice 101 in the bracket 85. 100 is a gear-wheel secured to shaft 96 and meshing with the gear 92. 97 is a ribbon-guide roller secured to shaft 96. 98 is another shaft extending across the machine and turning in bearings in the beam-stand. The shaft 98 extends through a recess 102 in bracket 85. 99 is a ribbon-guide roller secured to shaft 97. 103 103 are brackets secured to the beam-stand, and 104 a shaft extending across the machine and supported in said brackets. 105 represents ribbon-spools arranged along said shaft. Each ribbon extends from its spool 105 to and partly around roller 99, thence between rollers 99 and 97, thence partly around roller 97, and thence down to the guides and needles. As a lug on the pattern-chain passes under and elevates the end of the bell-crank connected with the chain of mechanism for turning shaft 70, as before described, the shaft 79 in said chain of mechanism raises the link 95, whereby the lever 93 is turned on its axis, causing the pawls 94 to engage and turn the ratchet-wheel 90. The gear 92 being secured to ratchet 90 turns therewith and turns the gear 100, thereby turning the shaft 96 and guide-roller 97. The ribbons z being confined between rollers 97 and 99 are there-

by fed off their spools 105. It will be understood that the ribbon is fed from its spool or beam each time the bell-crank is underridden by a lug whether high or low. When the mechanism is actuated by a low lug, the ratchet will be turned, say, only one tooth, whereas when the mechanism is actuated by a high lug the ratchet will be turned a plurality of teeth. Thus the ribbon will be fed from its spool or beam during the operation of the looping-fingers and also during the normal knitting operation. The length of ribbon fed from the spools at each operation of the actuating mechanism may be regulated in different ways. For example, gears of different sizes may be substituted for the gears 92 and 100 to turn the latter a greater or less distance on its axis, and thus increase or decrease the feed, or the link 95 may be adjusted at different positions along the lever 93.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, and means to actuate the looping-finger, substantially as described.

2. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, and means to hold the previously-looped ribbon from being drawn back under the action of the looping-finger, substantially as described.

3. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, a clamping-bar adapted to engage the ribbon at a point beyond the point of engagement of the looping-finger, and means to actuate the clamping-bar and looping-finger, substantially as described.

4. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, a clamping-bar adapted to hold the previously-looped ribbon from being drawn back under the action of the looping-finger, a holding device adapted to engage the ribbon between the knitting-point of the trimming and the looping-finger, and means adapted to simultaneously move the clamping-bar and looping-finger into operation and the holding device out of operation, substantially as described.

5. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, a clamping-bar adapted to hold the previously-looped ribbon from being drawn back under the action of the looping-finger, means for actuating the looping-finger and clamping-bar simultaneously, a source of ribbon-supply, and feeding mechanism to positively feed the ribbon toward the knitting-point, thereby enabling the looping-finger to readily draw the ribbon so fed into a loop, substantially as described.

anism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, a source of ribbon-supply, and feeding mechanism to positively feed the ribbon toward the knitting-point, substantially as described.

6. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, a clamping-bar adapted to hold the previously-looped ribbon from being drawn back under the action of the looping-finger, means for actuating the looping-finger and clamping-bar simultaneously, a source of ribbon-supply, and feeding mechanism to positively feed the ribbon toward the knitting-point, thereby enabling the looping-finger to readily draw the ribbon so fed into a loop, substantially as described.

7. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping-finger adapted to engage the ribbon and form a loop therein, a clamping-bar adapted to engage a ribbon at a point beyond the engagement of the looping-finger, a normally operative holding device adapted to engage the ribbon between the knitting-point of the trimming and the looping-finger, means to simultaneously move the looping-finger and clamping-bar into operation and the holding device out of operation, and feeding mechanism to positively feed the ribbon toward the knitting-point, substantially as described.

8. In a machine for making ribbon-containing lace trimming, the combination with mechanism to form the trimming and insert the ribbon therein, of a slide, a slide-bar secured thereto, and a looping-finger adjustably secured to the slide-bar and adapted, in the operation of the slide, to move forwardly and engage and form a loop in the ribbon, substantially as described.

9. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of two plates along the faces of which the trimming so formed travels, a slide, a slide-bar secured thereto, a looping-finger secured to the slide-bar and adapted, in the operation of the slide, to move forwardly between said plates and engage and form a loop in the ribbon, and means to operate the slide, substantially as described.

10. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of two plates along the faces of which the trimming so formed travels, a slide, a slide-bar secured thereto, a looping-finger secured to the slide-bar and adapted, in the operation of the slide, to move forwardly

between said plates and engage and form a loop in the ribbon, a clamping-bar also carried by the slide and adapted, in the operation of the slide, to clamp the ribbon between it and one of said plates, and means to operate the slide, substantially as described.

11. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, a needle-plate and an abutment-plate along the faces of which the trimming so formed travels, said plates having their faces in alinement and separated from each other by a space, a slide, a slide-bar secured thereto, a looping-finger secured to the slide-bar and adapted, in the operation of the slide, to move forwardly between said plates and engage and form a loop in the ribbon, a clamping-bar also carried by the slide and adapted, in the operation of the slide, to clamp the ribbon between it and the abutment-plate, and means to operate the slide, substantially as described.

12. In a machine for making ribbon-containing lace trimming, the combination with mechanism to form the trimming and insert the ribbon therein, of two plates along the faces of which the trimming so formed travels, a slide, a slide-bar secured thereto, a looping-finger secured to the slide-bar and adapted, in the operation of the slide, to move forwardly between said plates and engage and form a loop in the ribbon, a clamping-bar, a device to force said clamping-bar forwardly thereby clamping the ribbon between it and one of said plates, a spring interposed between said device and the clamping-bar, and means to operate the slide, substantially as described.

13. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a slide, a bracket secured thereto having orificed depending legs, a clamping-bar, a rod secured thereto extending through said orificed legs, a stop on said rod, a spring confined between the stop and one of the legs of the bracket, means to actuate the slide, thereby, through said spring, moving the clamping-bar forwardly, an abutment between which and the clamping-bar the ribbon is confined when said slide is so actuated, and a looping-finger adapted to form a loop in the ribbon simultaneously with the operation of the clamping-bar, substantially as described.

14. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, a needle-plate and an abutment-plate along the faces of which the trimming so formed travels, said plates having their faces in alinement and separated from each other by a space, a slide, a slide-bar secured thereto, a looping-finger secured to the slide-bar and adapted, in the operation of the slide,

to move forwardly between said plates and engage and form a loop in the ribbon, a clamping-bar opposite the abutment-plate, a rod to which the clamping-bar is secured, a bracket secured to the slide having orificed legs through which said rod extends, a stop on said rod, a spring confined between said stop and one of the legs of the bracket, and means to move said slide, substantially as described.

15. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping device adapted to form a loop in the ribbon of the previously-inserted trimming, a holding device adapted to engage the ribbon between the knitting-point and the looping-point of the trimming, and means to simultaneously move one of said devices into action and the other out of action and vice versa, substantially as described.

16. In a machine for making ribbon-containing lace trimming, the combination with the mechanism for forming the trimming and inserting the ribbon, of a needle-plate along the face of which the ribbon so formed travels, a ribbon-holding device beyond the knitting-point adapted to normally hold the ribbon between itself and said plate, a looping-finger beyond the ribbon-holding device, a shaft, and mechanism actuated thereby adapted to simultaneously advance the looping-finger into operative position and withdraw the holding device out of operative position, substantially as described.

17. In a machine for making ribbon-containing lace trimming, the combination, with the mechanism for forming the trimming and inserting the ribbon, of a needle-plate along the face of which the ribbon so formed travels, a ribbon-holding device beyond the knitting-point adapted to normally hold the ribbon between itself and said plate, a slide, a slide-bar connected to said slide, a looping-finger secured to said slide-bar, a shaft, a bell-crank lever thereon, one arm of which is connected to said slide while the other arm is adapted to move said holding device out of operative position, and means to intermittently oscillate said shaft, substantially as described.

18. In a machine for making ribbon-containing lace trimming, the combination, with the guides and needles for forming the trimming and inserting the ribbon, of a looping-finger for forming loops in the ribbon, a clamping-bar for clamping the ribbon during the looping operation, a pattern-wheel, pattern-chains thereon, a series of levers adapted to be actuated thereby and connected with a plurality of said guides, a lever connected with said looping-finger and clamping-bar, and a pattern-chain on said pattern-wheel for actuating the last-named lever, substantially as described.

19. In a machine for making ribbon-containing lace trimming, the combination, with the guides and needles for forming the trimming and inserting the ribbon, of a looping-finger for forming loops in the ribbon, a clamping-bar for clamping the ribbon during the looping operation, mechanism for positively feeding the ribbon toward the knitting-point, a pattern-wheel, a plurality of levers respectively connected with a plurality of said guides, a lever connected with the looping-finger, clamping-bar and feed mechanism, and pattern-chains on said pattern-wheel adapted to actuate the said levers, substantially as described.

20. In a machine for making ribbon-containing lace trimming, the combination with the mechanism for forming the trimming and inserting the ribbon, of a looping-finger for forming loops in the ribbon after the formation of the trimming and the insertion of the ribbon, mechanism for positively feeding the ribbon toward the knitting-point, a pattern-wheel, pattern-chains thereon, and means actuated by the pattern-chains connected with and adapted to operate the trimming-forming, ribbon-inserting, ribbon-feeding, and ribbon-looping mechanisms, substantially as described.

21. In a machine for making ribbon-containing lace trimming, the combination, with mechanism for forming the trimming and inserting the ribbon, of feeding mechanism for positively feeding the ribbon toward the knitting-point, pattern mechanism, and connections between the pattern mechanism and the trimming-forming and ribbon-inserting mechanism and the feed mechanism, substantially as described.

22. In a machine for making ribbon-containing lace trimming, the combination with mechanism for forming the trimming and inserting the ribbon, of ribbon-guide rollers between which the ribbon passes, a ratchet adapted to turn said rollers, a pawl adapted to actuate said ratchet, pattern mechanism, and connections from the pattern mechanism to the pawl and to the trimming-forming and ribbon-inserting mechanism, substantially as described.

23. In a machine for making ribbon-containing lace trimming, the combination, with mechanism for forming the trimming and inserting the ribbon, of ribbon-guide rollers between which the ribbon passes, a gear adapted to turn one of said rollers, a second gear actuating the first gear, a ratchet to which the second gear is secured, a pawl adapted to actuate the ratchet, and means to actuate the pawl and the ribbon-inserting and trimming-forming mechanism, substantially as described.

24. In a machine for making ribbon-containing lace trimming, the combination, with mechanism for forming the trimming and in-

serting the ribbon, of ribbon-guide rollers between which the ribbon passes, a ratchet, a gear removably secured thereto, a second gear actuated by the first gear, means actuated by the second gear to cause the ribbon to be positively fed toward the knitting-point, a lever, a pawl on said lever for actuating the ratchet, and means to actuate the pawl-lever and the trimming-forming and ribbon-inserting mechanism, substantially as described.

25. In a machine for making ribbon-containing lace trimming, the combination, with mechanism for forming the trimming and inserting the ribbon, of ribbon-guide rollers between which the ribbon passes, a bracket having a slot therein, a nut in the slot, a bolt engaging said nut, a ratchet loose on said bolt, a lever pivoted on said bolt, a pawl on said lever for actuating the ratchet, a gear-wheel removably secured to the ratchet, a second gear actuated by the first gear, means actuated by the second gear to cause the ribbon to be positively fed forward toward the knitting-point, and means to actuate said pawl-lever and the trimming-forming and ribbon-inserting mechanism, substantially as described.

26. In a machine for making ribbon-containing lace trimming, the combination with the mechanism for forming the trimming and inserting the ribbon, of a ribbon-spool, ribbon-guide rollers between the ribbon-spool and the knitting-point, a gear-wheel on one of said rollers, a bracket containing a T-slot, a nut therein, a bolt having a reduced portion entering the T-slot and engaging the nut, a ratchet loose on said bolt, a second gear-wheel secured to said ratchet and meshing with the first gear-wheel, a lever pivoted on said bolt, a pawl on said lever engaging said ratchet, a pattern-wheel, a pattern-chain thereon, a lever adapted to be operated by said chain, and mechanism connecting the last-named lever and the pawl-lever, whereby the ratchet is intermittently turned, thereby turning said gears and guide-rollers and positively feeding the ribbon toward the knitting-point, substantially as described.

27. In a machine for making ribbon-containing lace trimming, the combination, with the mechanism for forming the trimming and inserting the ribbon, of looping-fingers each having a slotted member, a slide-bar having a number of holes substantially in excess of the number of looping-fingers, means to move the slide-bar back and forth, and a bolt adapted to extend through the slot in each looping-finger and enter one of said holes, whereby the looping-fingers are longitudinally adjustable along the slide-bar in two ways, enabling them to be adjusted in any desired precise position, substantially as described.

28. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a source of ribbon-sup-

ply, and means adapted to hold the ribbon in the trimming so formed from being drawn toward its source of supply by the working tension of the said trimming-forming mechanism.

5 29. In a machine for making ribbon-containing lace trimming, the combination, with mechanism to form the trimming and insert the ribbon therein, of a looping device adapted to engage the ribbon and form loops there-
10 in, a source of ribbon-supply, and means adapted to hold the ribbon in the trimming so formed from being drawn toward its source of supply.

15 30. In a machine for making ribbon-containing lace trimming, the combination, with

mechanism to form the trimming and insert the ribbon therein, of a looping device adapted to engage the ribbon and form loops therein, a source of ribbon-supply, means adapted to hold the ribbon in the trimming so formed 20 from being drawn toward its source of supply, and feeding mechanism adapted to positively feed the ribbon from its source of supply.

In testimony of which invention I have hereunto set my hand, at Philadelphia, on this 25 28th day of October, 1904.

MAX N. AARON.

Witnesses:

M. M. HAMILTON,
T. B. WOOD.