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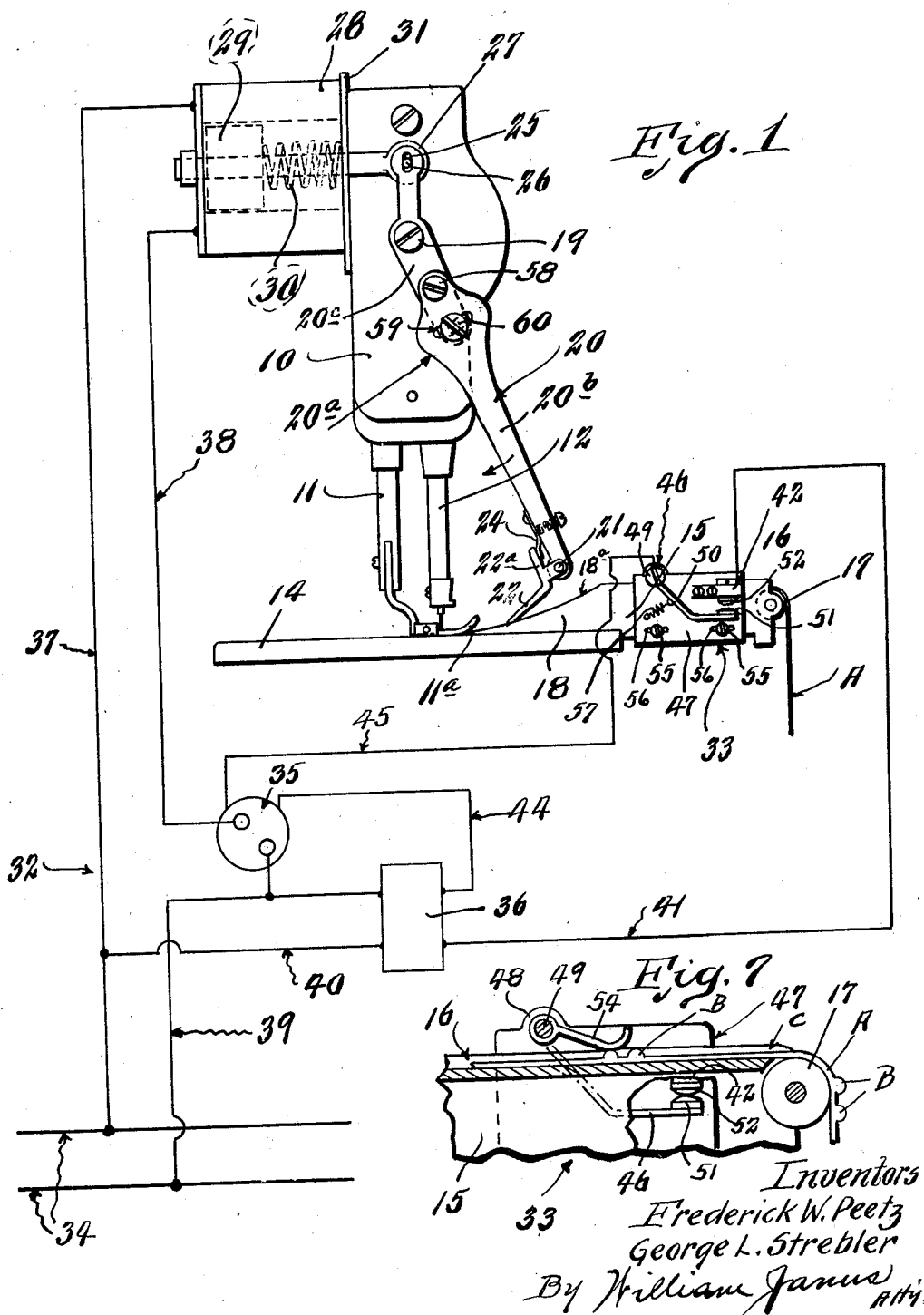
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PLAITING MACHINE

Filed Jan. 26, 1931

2 Sheets-Sheet 1



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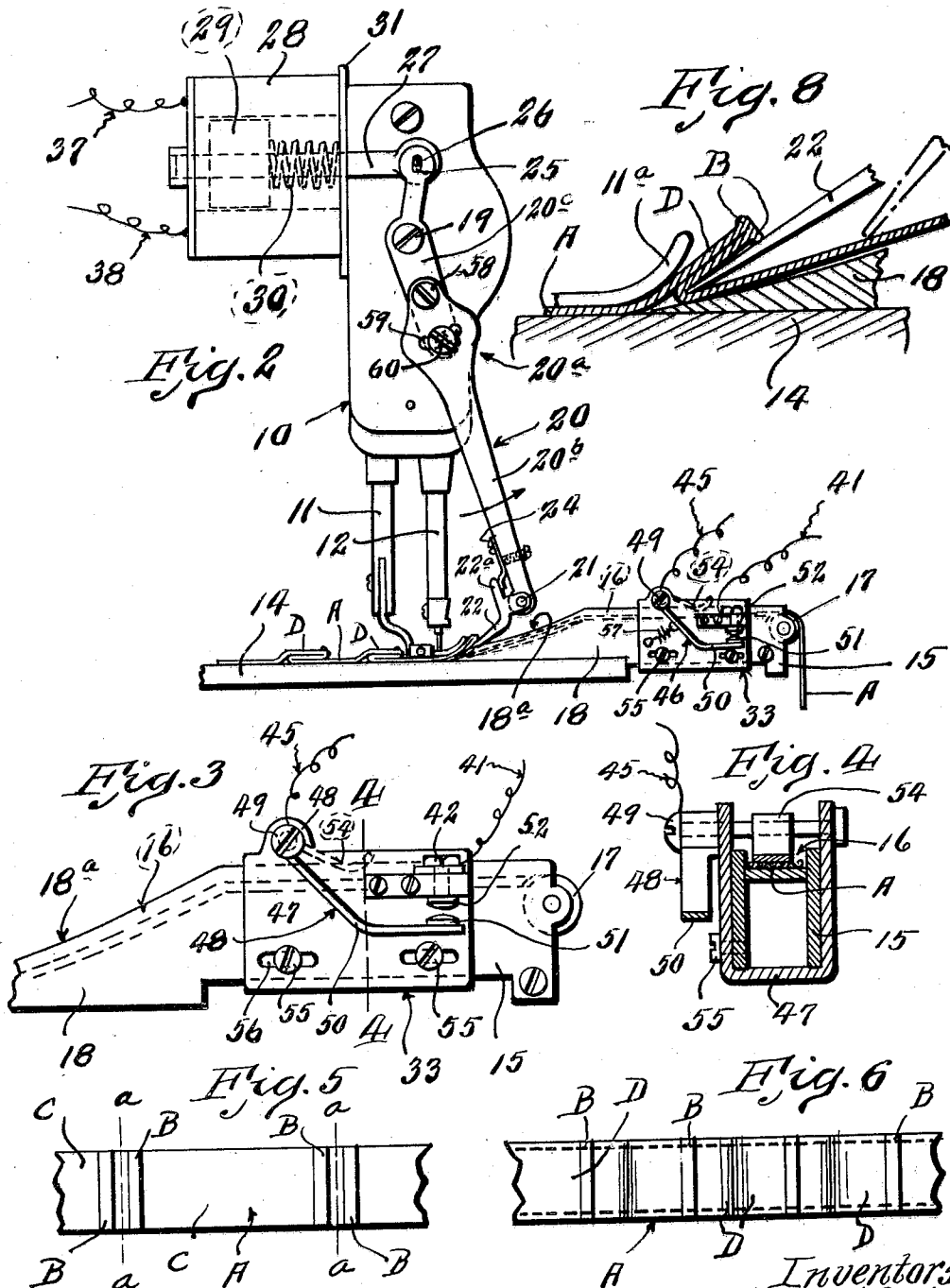
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UNITED STATES PATENT OFFICE

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PLAITING MACHINE

Application filed January 26, 1931. Serial No. 511,236.

This invention relates to new and useful improvements in attachments for sewing machines, and more particularly to plaiting devices.

5 In a copending application filed by one of the present applicants, Frederick W. Peetz, September 20, 1930, Serial Number 483,220, a securing band is disclosed having a plurality of plait pockets adapted to be selectively engaged by a hook attached to the other end of the band so that the size of the opening can be regulated. This adjustable band is formed by folding the band upon itself at spaced intervals and sewing said band thus plaited along the edges, leaving the pockets or plaits open for the reception of a hook. The edge of the plait where the hook enters the pocket is subjected to most wear and is, therefore, reinforced on each side, preferably by a heavy thread woven into the fabric. This not only reinforces the plait at this point but also provides a thickened edge which serves to retain the hook in position. Before the band is plaited, the reinforcements are disposed transversely of the band at spaced intervals and are arranged in pairs, the reinforcing members of each pair being spaced from each other a sufficient distance to permit folding of the fabric and forming the forward edge of the plait intermediate said reinforcing members.

It is one of the objects of the present invention to provide a machine which will fold or plait such reinforced band at the proper points in an efficient and economical manner.

Another object of the invention is to provide a plaiting attachment for sewing machines having a plaiter arm or gatherer which is automatically actuated by a solenoid, the energizing circuit of the latter being controlled by a suitable switch which is operated by the raised reinforced portions of the band so that said arm is actuated in accordance with the spacing of said reinforcements.

Other objects of the invention are to provide an electric switch for controlling the energizing circuit of the solenoid, said switch having a stationary contact and a movable

contact, the latter being normally held in open relation with the former and being carried by a rock shaft to which is fixed a rock arm which is engageable and movable upwardly by the reinforcing portions of the band as the latter passes thereunder toward the sewing machine. The upward movement of the rock arm causes upward movement of said movable contact member and the closing of the energizing circuit.

Additional objects of the invention are to provide a plaiting device which is automatically operated to plait the band at the appropriate points and present it to the sewing machine, said device being controlled by the reinforcements or raised portions formed in said band and said device being adapted to be used with existing types of sewing machines and to be manufactured at low cost.

With these and other objects in view, our invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is an elevational view of the head of a sewing machine having the plaiting device attached thereto and showing diagrammatically the electric circuit controlling the same.

Figure 2 is a similar view, showing the device in moved or plait-forming position and the switch controlling the circuit in closed position.

Figure 3 is an enlarged detail view of the switch, showing the movable contact member in open position.

Figure 4 is a vertical cross section taken on line 4—4 of Figure 3.

Figure 5 is a detail view of the band before it is plaited.

Figure 6 is a detail view of the band after the plaiting operation.

Figure 7 is a fragmental enlarged sectional view showing the arm in raised position and the switch contacts closed.

Figure 8 is an enlarged detail cross section showing the plaiting blade in forming position.

Referring by numerals to the accompany-

ing drawings, 10 indicates the head of a sewing machine having a presser foot 11 and a needle bar 12, and a table 14, all of which are of usual construction.

5 A shelf 15 is located forward of table 14 and is raised a suitable distance with respect thereto. The upper face thereof is channeled, as indicated at 16, and forms a guide for the band A which passes thereover to the
10 sewing machine. The forward end of the shelf is provided with a roller 17 over which said band passes to said shelf and the rear end of the latter is tapered toward the presser foot 11 as indicated at 18, the upper face of
15 said tapering end being arranged concentrically with the fulcrum 19 of a plaiter arm 20.

This arm is pivotally mounted on the head 10 for oscillatory movement in a vertical plane. The lower end of said arm terminates short of the concave face 18a and has
20 pivotally mounted thereon, as at 21, a finger or blade 22 which is arranged obliquely to arm 20 and has its lower end operating over said concave face 18a. This finger is held
25 yieldingly thereagainst by a spring 24 which is secured to arm 20 and bears against the inner side of an extension 22a of said finger 22. This finger passes over the band during
30 the outward movement of the arm (indicated by solid line arrow in Fig. 2) and is adapted to engage the band and fold it upon itself upon the inward movement of the arm (indicated by solid line arrow in Fig. 1).

Arm 20 extends beyond pivot 19 and is provided with a slot 25 in which operates a pin
35 26. This pin extends laterally from the outer end of a sliding member 27. A solenoid 28 is fixed to head 10 and member 27 extends axially in said solenoid and has fixed thereon
40 an armature 29 which operates in said solenoid. A coiled spring 30 is arranged on member 27 and one end of said spring bears against armature 29 while the other end bears against plate 31 of said solenoid, thereby holding
45 member 27 in retracted position with the arm moved in outward position, as shown in Figure 1.

The solenoid is energized by an electric circuit 32 which is controlled by a switch 33 and
50 is supplied from main lines 34. In order to permit the solenoid 28 to operate on standard voltage (such as, for instance, 110 volts) without creating a hazard by the operation of the switch, a low voltage relay 35 and a transformer 36 are arranged in said circuit (see
55 Fig. 1).

One terminal of the solenoid is connected by a wire 37 to one of the main lines, while the other terminal is connected by a wire 38
60 to said relay 35. The other main line 34 is connected by a connection 39 to said low voltage relay and to one of the terminals of the primary of transformer 36. A wire 40 connects wire 37 with the other terminal of the
65 primary of said transformer. Wire 41 con-

nects one of the terminals of the secondary of the transformer with a stationary contact 42 of switch 33 and wire 44 connects the other terminal of said secondary with said relay 35, which in turn is connected by a wire
70 45 to a movable contact 46 of switch 33. Thus the switch is operated at low voltage (in the present instance 24 volts), thereby eliminating all danger of sparking or injury from excessive voltage. Switch 33 is mounted or
75 includes a U-shaped member 47 which is mounted on shelf 15 between roller 17 and the rear end of said shelf. The upper edges of member 47 extend a suitable distance above channel 16 and are provided near the rear
80 end with bearings 48 in which is revolvably mounted a transversely disposed screw or shaft 49. The movable contact 46 includes a contact arm 50 which is fixed to one end of
85 said shaft 49 and is located to one side of member 47. This movable contact arm 50 extends downwardly and forwardly and is provided at its free end with an upwardly presented contact 51 which, when
90 said contact arm 50 is moved upwardly, engages contact 52 of stationary contact member 42, thereby completing the circuit of the secondary of the transformer and operating
95 low relay 35 so as to close the circuit of solenoid 28, and causing actuation of member 29 and plaiting band arm 20.

Contact arm 50 is automatically raised into circuit closing position by the raised portion or reinforcements B formed on band A, as
100 the latter is fed toward the sewing machine. This actuation of the movable contact arm is effected by means of a foot 54 which is fixed to shaft 49 intermediate the upwardly presented portions of member 47 and which
105 operates in channel 16. When said foot rests in the bottom of the channel or on the smooth surface C of band A, contact arm 50 occupies depressed position with the contacts 51 and 52 disengaged. When, however, raised
110 portions B pass under foot 54, the latter is raised, thereby rocking shaft 49 and causing upward movement of contact arm 50 and bringing the contact 51 thereof into engagement with stationary contact 52.
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As soon as the raised portions or reinforcements B move beyond foot 54, the latter descends upon the smooth surface C and permits the contact arm 50 to drop so as to disengage
120 contact 51 from the stationary contact 52. Switch 33 is so arranged with respect to the spacing of reinforcements B that when the foot 54 is engaged by said reinforcements, another pair of said reinforcements is
125 disposed immediately ahead of the presser foot of the sewing machine so that as arm 20 is actuated and plaiting blade 22 moves toward said presser foot to plait or fold the band, said band is folded on a line a—a intermediate said reinforcements so that one of said
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reinforcements is disposed on each side of the edge of the plait pocket.

U-shaped member 47 is held in position on shelf 15 by means of screws 55, which are secured to said shelf, and elongated slots 56, the latter being formed in member 47. Thus said member and the switch mechanism carried thereby can be adjusted longitudinally of said shelf so as to correlate the point of inter-engagement between the foot 54 and the reinforcements or raised portions B with the position and operative movement of the plaiting blade 22 in order to insure the folding of the band A on line *a-a*.

To insure disengagement of contacts 51 and 52, a coiled spring 57 is connected at one end to arm 50 and tends to hold the latter in open position.

Preferably arm 20 is formed jointed, as indicated at 20*a*, to provide for greater range of adjustment of the device. As shown, the lower portion 20*b* is pivotally mounted at 58 to the upper portion 20*c* of arm 20. Thus the lower portion 20*b* can be adjusted relatively to the upper portion so that the plaiting blade or finger 22 carried by portion 20*b* can be positioned with greater accuracy and independently of the upper portion of arm 20 and parts associated therewith.

In order to hold portions 20*b* and 20*c* in adjusted relation, portion 20*b* is provided with an arcuate slot 59 concentric with pivot 58. A screw 60 is screw-seated in the lower end of portion 20*c* and extends through said slot and has its head bearing against the slotted portion of half 20*b*. Thus said portions 20*b* and 20*c* can be clamped in adjusted positions by means of said screw.

In the operation of our device, the electric circuit is closed every time the raised portions B pass under foot 54 during the travel of band A to the sewing mechanism. Foot 54 and arm 50 are so arranged that this difference in elevation in foot 54 is sufficient to bring contact 51 into engagement with contact 52 to close the solenoid circuit. When the solenoid 28 is energized, it causes forward movement of member 27, thereby actuating arm 20 so that the plaiting blade 22 is moved toward presser foot 11*a* thereby folding or plaiting the band, as indicated at D, immediately before said band is passed under said presser foot.

As soon as the circuit is open, solenoid 28 is deenergized and spring 30 restores member 27 to its normal position, thereby restoring arm 20 to position shown in Figure 1 in readiness for the next plaiting operation.

While we have shown our device attached to one style of a sewing machine, it is obvious that our invention can be used with slight modifications and arrangements of parts in conjunction with other types of sewing machines.

We claim:

1. In a device of the class described, the combination with a sewing machine including a presser foot, of an oscillatory arm, a plaiting blade carried by the lower end thereof and operable thereby toward and away from said presser foot to form plaits in a band which is operated upon by said sewing machine, said band being formed with a plurality of spaced transverse raised portions, an electro-magnetic means for actuating said arm, an electric circuit for energizing said means, and a switch interposed in said circuit and operable in correlation with the raised portions of said band to close said circuit and cause actuation of said arm to produce a plait in said band at predetermined intervals and immediately before the engagement of the plaited portion with said presser foot.

2. In a device of the class described, the combination with a sewing mechanism including a presser foot, of an oscillatory arm, a plaiting blade carried by the lower end thereof and adapted to form a plait in a band which is being fed to said sewing mechanism, said band being formed with a plurality of spaced transverse raised portions, an electro-magnetic means for actuating said arm, an electric circuit for energizing said means, a switch interposed in said circuit and including a stationary contact and a movable contact, and a foot cooperating with said movable contact and riding upon the band to be plaited, said foot being operable in a vertical plane by the raised portions of said band to cause engagement of said contacts and the subsequent operation of the plaiting blade when said foot occupies raised position and to cause disengagement of said contacts and the restoration to normal position of said plaiting blade when said foot occupies depressed position.

3. In a device of the class described, the combination with a sewing machine mechanism including a presser foot, of an oscillatory arm, a plaiting blade carried thereby and movable relatively to said presser foot, said plaiting blade being adapted to produce upon its movement toward said presser foot a plait or fold in a band which is being fed to said sewing machine mechanism, said band being formed with a plurality of spaced transverse portions, an electro-magnetic means for actuating said arm, an electric circuit for energizing said means, a stationary contact in said circuit, a movable contact adapted to engage said stationary contact and close said circuit, and a foot conjoined to said movable contact and adapted to be engaged by the raised portions of said band as the latter is fed to said sewing machine mechanism, said foot being operable in one direction by the irregular contour of said band to cause interengagement of said contacts and the closing of the electric circuit and in opposite direction to disengage

said contacts and open said electric circuit.

4. In a device of the class described, the combination with a sewing machine mechanism including a presser foot, of an oscillatory arm, a plaiting blade carried by the lower end thereof and operable over a band to be plaited to form a plait therein upon the movement of said blade toward said presser foot, an electro-magnetic means for actuating said arm into plait-forming position, a spring for restoring said arm to home position, an electric circuit for energizing said electro-magnetic means, and a switch interposed in said circuit for opening and closing the latter, said band being provided with a plurality of spaced transverse raised portions, said switch including a member engageable by said raised portions of said band as the latter is being fed to said presser foot, whereby said member is operated to close said switch and actuate said arm at regular intervals in accordance with spacing of said raised portions of said band.

5. In a device of the class described, the combination with a sewing machine mechanism including a presser foot, of an oscillatory arm operable in a vertical plane, a plaiting blade yieldably carried by the lower end of said arm and movable to and from said presser foot, an electro-magnetic means for actuating said arm, an electric circuit for energizing said means, a shelf disposed below said plaiting blade and provided with a channel aligned with said presser foot, that portion of the shelf arranged adjacent to said presser foot being curved downwardly concentrically with the travel of said plaiting blade, whereby a band to be plaited is caused to traverse said channel before being engaged by said presser foot, a switch disposed to one side of said shelf, said switch including a stationary contact and a movable contact, the latter being operable to open and close said circuit, and a foot operatively mounted on said shelf and resting upon the upper face of the band traversing said channel, said band being formed with a plurality of spaced transversely disposed raised portions, said foot being operable in a vertical plane by said raised portions and being coupled with said movable contact whereby upon the upward movement of said foot said movable contact is brought into engagement with said stationary contact to close said electric circuit and actuate said plaiting blade to form a plait in said band immediately before the engagement thereof by said presser foot.

6. In a device of the class described, the combination with a sewing machine mechanism including a presser foot, of a movable arm, a plaiting blade carried by said arm and movable to form a plait in a band immediately before the engagement of the latter by said presser foot, said band being provided with a

plurality of spaced transverse raised portions, an electro-responsive means for actuating said arm, an electric circuit for energizing said means, a switch interposed in said circuit, a spring for normally holding said switch in open position, and a member cooperating with said switch and engaging the upper surface of said band and movable by said raised portions thereof upwardly to close said switch.

7. In a device of the class described, the combination with a sewing machine mechanism, of an oscillatory arm, a plaiting blade carried by the lower end thereof, and movable relatively to said sewing machine mechanism to form a plait in a band preliminary to the sewing operation, an electro-responsive means for actuating said arm into plait-forming position, an electric circuit for energizing said electro-responsive means, a shelf arranged adjacent to said sewing machine mechanism and provided with a channel through which the band is fed to said mechanism, said band being provided with transversely disposed spaced reinforcements projecting above the surface of said band, and a member operating within said channel and resting upon said band and movable upwardly by said raised reinforcements, said member being operatively associated with said switch to close the latter when engaged by said raised portions.

8. In a plaiting device of the class described, the combination with a sewing machine mechanism including a presser foot, of a shelf extending forwardly from said presser foot and provided with a channel over which a band is fed to said sewing machine mechanism, said band being provided with spaced transversely disposed portions which project upwardly above the surface of said band, a plaiting blade for engaging said band and forming a plait therein immediately before the engagement thereof by said presser foot, means for actuating said plaiting blade and including electro-responsive means, an electric circuit for energizing said electro-responsive means, a switch arranged adjacent to said shelf and controlling said circuit, a spring for holding said switch in open position, and a member mounted on said shelf and resting upon the upper face of said band, said member being operatively associated with said switch for closing the latter when said member is moved upwardly by the raised portions of said band.

9. In a device for forming plaits in a band having spaced transverse reinforcements raised above the surface of said band, the combination of an oscillatory arm, a plaiting blade carried by the lower end of said arm and engaging said band to form a plait therein, electro-responsive means for operating said arm into plaiting position, a switch for controlling said electro-responsive means,

and a member operatively associated with said switch and cooperating with said band and closing said switch upon the engagement of said member with the raised reinforcements of said band.

10. In a device for forming plaits in a band having spaced reinforcements raised above the surface of the band, the combination of an oscillatory arm, a plaiting blade yieldably mounted on the lower end of said arm and adapted when moved in one direction to form a plait in said band, an electro-responsive means for actuating said arm into plait-forming position, a spring for moving said arm in opposite direction, a switch for controlling said electro-responsive means, and a member operatively associated with said switch and operable by the raised portions of said band to close said switch.

11. In a device of the class described, the combination with a sewing machine mechanism, of an oscillatory arm, a blade carried by the lower end thereof and adapted to engage a band and form a plait therein, said band being formed with spaced transversely disposed raised portions, an electro-magnet for actuating said arm to move said blade into plait-forming position, a spring for moving said arm in opposite direction, an electric circuit for said electro-magnet, a foot member resting on said band at a point a suitable distance from said sewing machine mechanism and movably mounted for movement in a vertical plane upon engagement with the raised portions of said band, and a switch normally held open and operable by said foot member into closed position to energize said electro-magnet and actuate said arm at regular intervals corresponding to the spacing of said raised portions on said band.

12. In a device of the class described, the combination with a sewing machine mechanism, of a stationary shelf arranged in alignment therewith and provided with a channel adapted to be traversed by a band to be plaited, said band being formed with spaced transversely disposed raised portions, means for engaging said band and forming a plait therein immediately before the engagement thereof by said sewing machine mechanism, an electro-magnet for actuating said means, a member movably mounted on said shelf and engaging the upper face of said band and movable upwardly by the raised portions thereof, a switch for controlling said electro-magnet, a spring for holding said switch in open position, and connections between said switch and said member for closing said switch when said member is moved upwardly by the raised portions of said band.

13. In a device of the class described, the combination with a sewing mechanism, of an oscillatory arm, a blade carried by one end thereof and adapted to engage a band and form a transverse plait therein, said band

being provided with spaced transversely disposed raised portions, an electro-responsive means for actuating said arm into plait-forming position, means for restoring said arm to normal position, an electric circuit for energizing said electro-responsive means, a switch for controlling said circuit, and means located ahead of said sewing mechanism and engaging said band, said means being operatively connected to said switch and movable by the raised portions of said band to close said circuit and energize said electro-responsive means.

In testimony whereof we hereunto affix our signatures this 7th day of January, 1931.

FREDERICK W. PEETZ.
GEORGE L. STREBLER.