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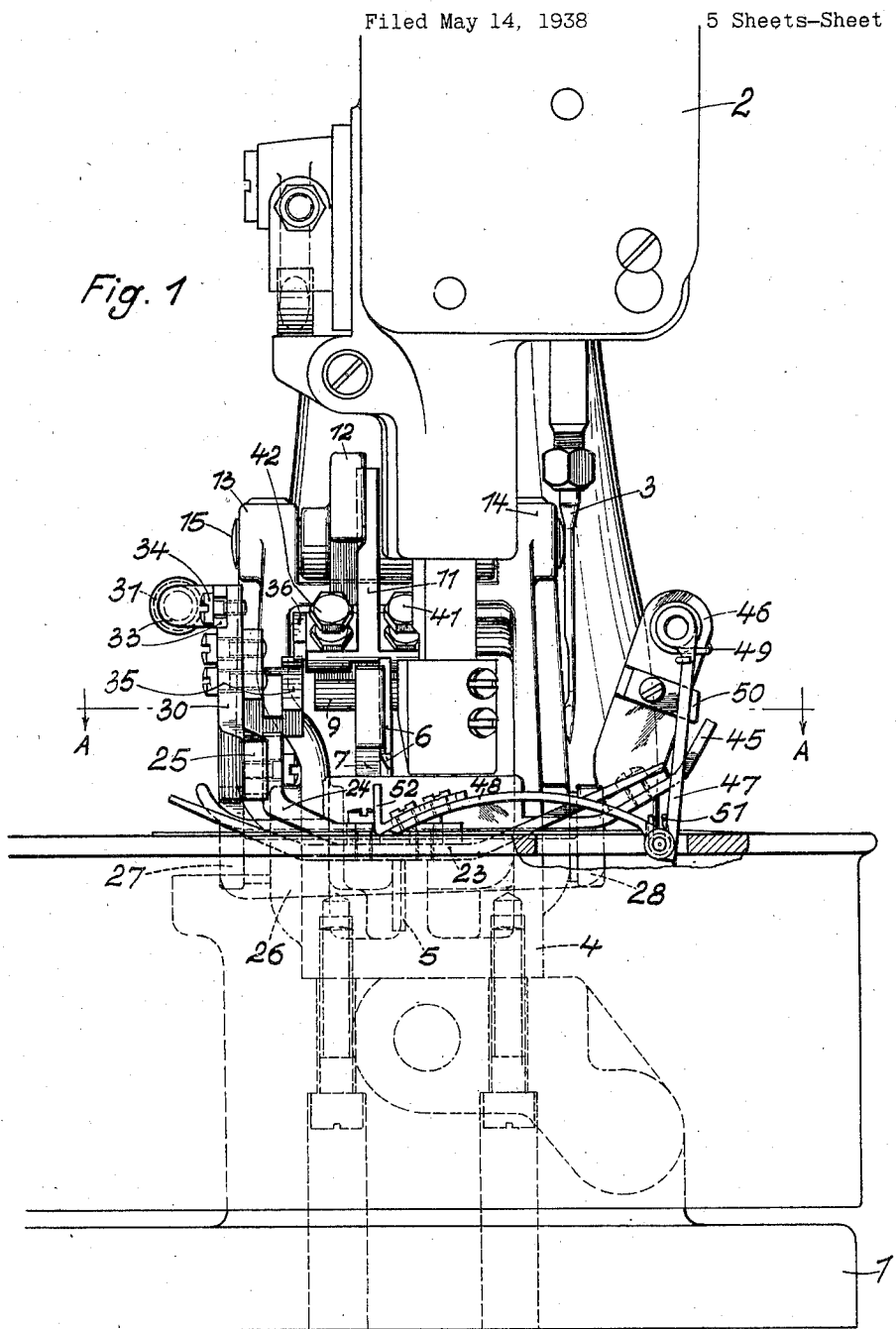
F. LUTZ

2,148,377

SEWING MACHINE HAVING AUTOMATICALLY OPERATED CUTTING DEVICES

Filed May 14, 1938

5 Sheets-Sheet 1



Inventor:
Fritz Lutz,
BY Paul Paul
Attorneys.

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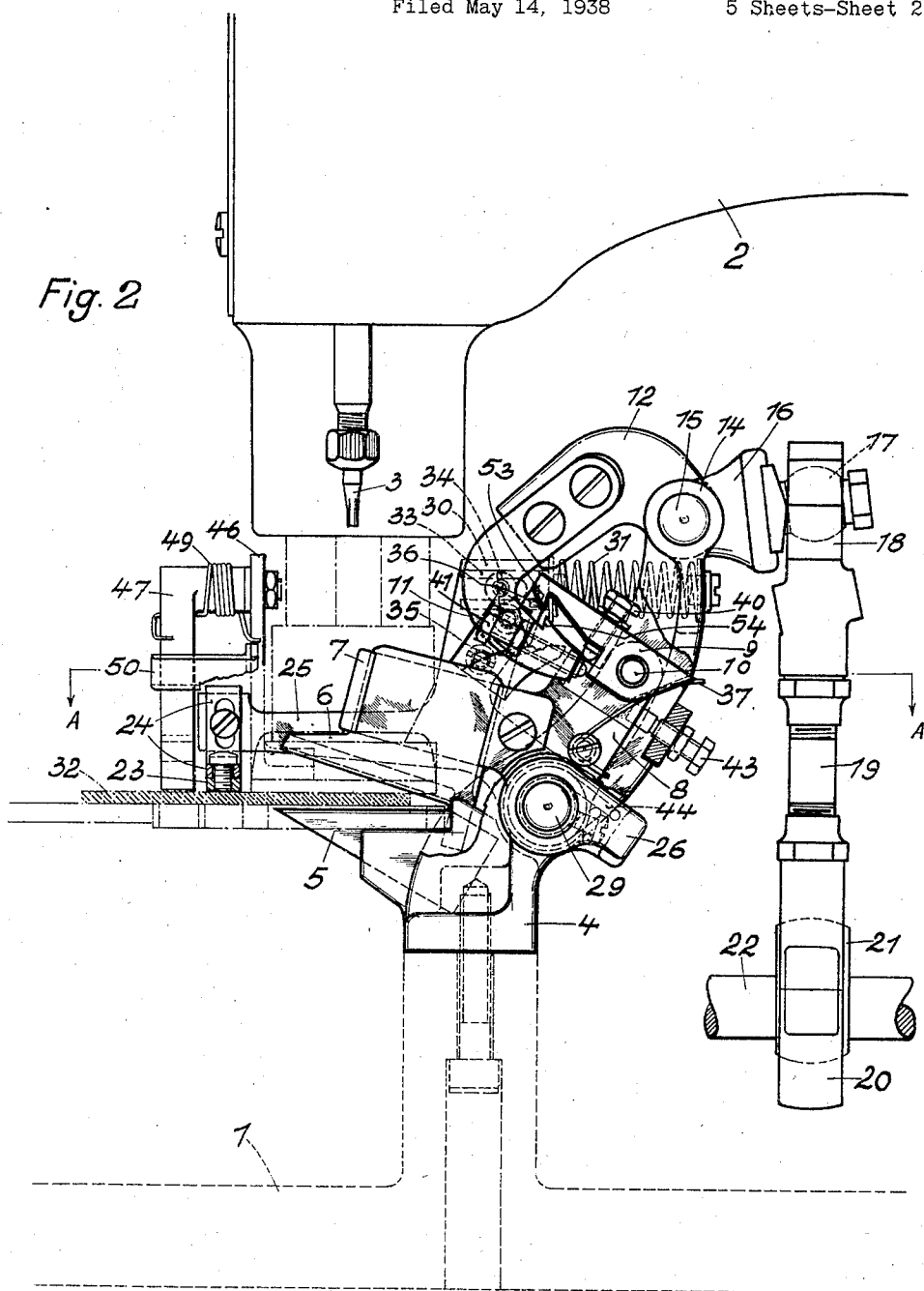
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5 Sheets-Sheet 2



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Fritz Lutz,
BY Paul Paul
Attorneys.

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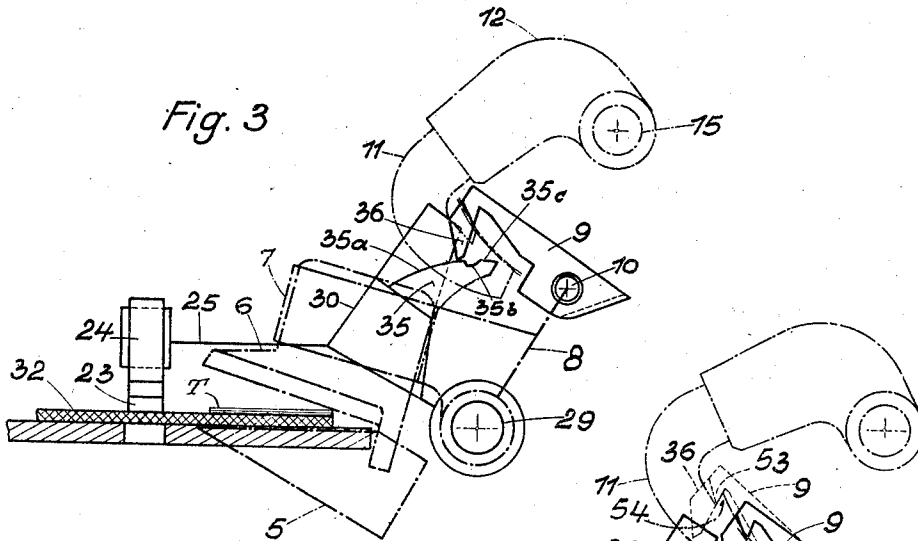


Fig. 4

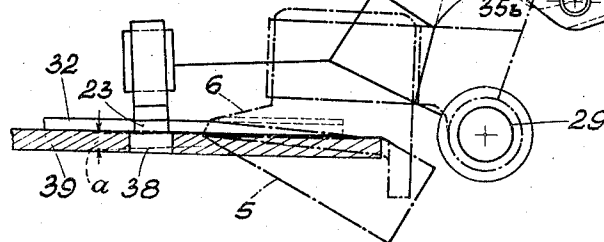
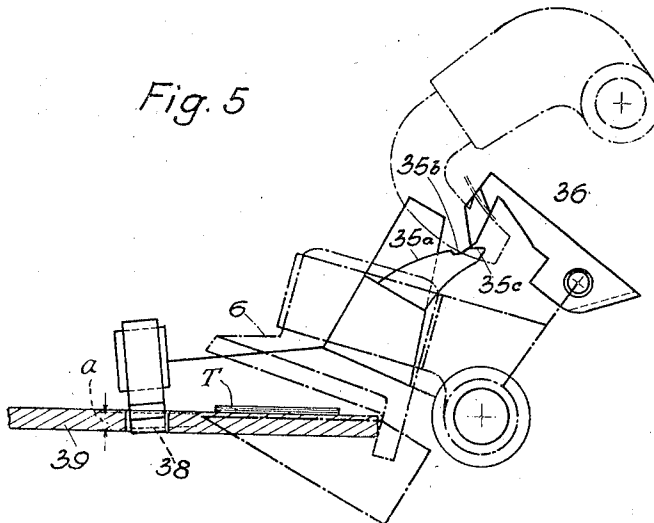


Fig. 5



Inventor:
Fritz Lutz,
BY Paul Paul,
Attorneys.

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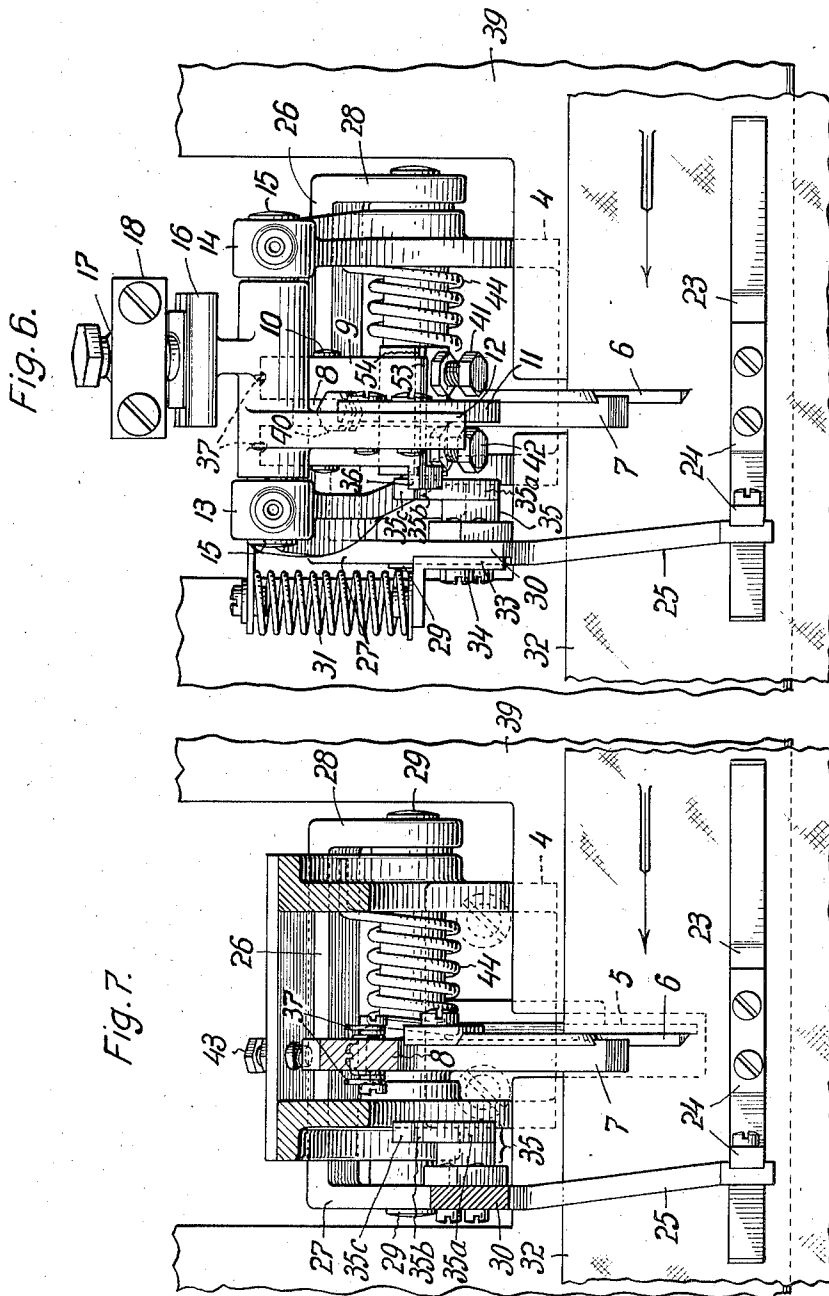
F. LUTZ

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SEWING MACHINE HAVING AUTOMATICALLY OPERATED CUTTING DEVICES

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5 Sheets-Sheet 4



INVENTOR:
Fritz Lutz,
BY *Paul Paul*
ATTORNEYS.

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5 Sheets-Sheet 5

Fig. 9.

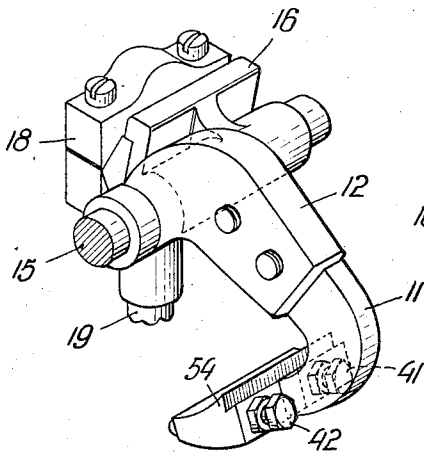


Fig. 10.

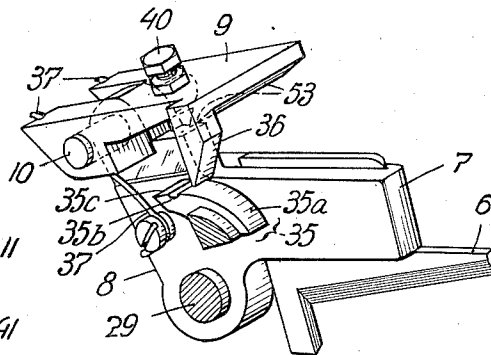


Fig. 8.

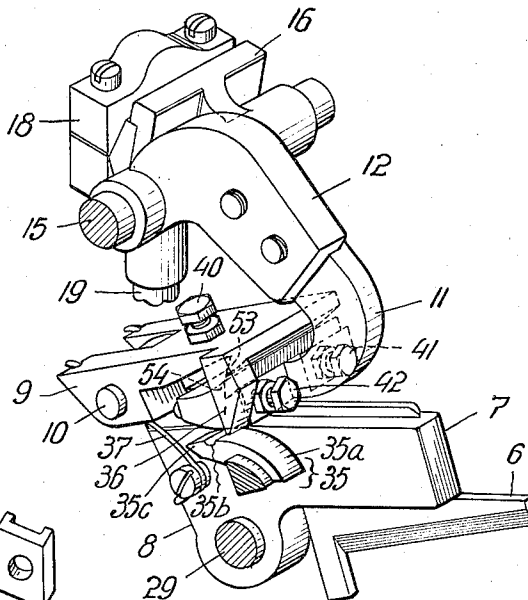
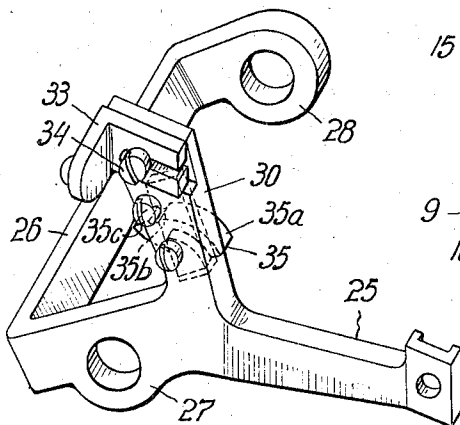


Fig. 11.



INVENTOR:
Fritz Lutz,
BY *Paul Paul*
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,148,377

SEWING MACHINE HAVING AUTOMATICALLY OPERATED CUTTING DEVICES

Fritz Lutz, Stuttgart, Germany, assignor to Union Special Maschinenfabrik G. m. b. H., Stuttgart, Wurttemberg, Germany

Application May 14, 1938, Serial No. 207,891
In Germany January 15, 1937

9 Claims. (Cl. 112—252)

This invention relates to sewing machines with cutting mechanism for severing connecting stitch chains and/or reinforcing strips between articles such as bags successively passed through the machine.

My invention is concerned more particularly with the provision of cutting mechanism by which the connecting stitch chains or strips are severed at a predetermined distance in advance of each article, and again at a predetermined distance rearward of each article irrespective of variations either in the width or thickness of the articles or in the spacing of the articles.

In connection with cutting mechanism suitable for carrying out the foregoing, I aim to secure through simplification and improved coordination of the component parts, greater accuracy and reliability in operation particularly at high speeds for attainment of a maximum output from the sewing machines.

How the foregoing and other important objects and advantages may be attained in practice will appear from the following detailed description of the attached drawings, wherein

Figure 1 shows the new sewing machine in front elevation, partly sectioned.

Figure 2 is a corresponding side elevation, in which the presser foot and the needle plate are shown in dash-dotted lines.

Figures 3-5 illustrate diagrammatically the method of operation of the new cutting device.

Fig. 6 is a fragmentary view of the machine in top plan.

Fig. 7 is a fragmentary view in horizontal section taken as indicated by the arrows A-A in Fig. II; and

Figs. 8, 9, 10, and 11 are perspective views of the cutting mechanism.

In the example of construction shown, the machine has a hollow base 1 containing the lower stitch forming mechanism, and an overhanging arm 2 for the needle 3 and its associated parts.

According to the present invention, there is secured on the base 1 of the machine a bracket-like frame element 4, which serves to support the parts of the cutting mechanism which includes a lower, fixed knife 5, and a movable, upper knife 6. The latter is carried by an arm 7, which is rigidly connected with a carrier 8; and a coupling member in the form of a latch dog 9 is pivoted on a bolt or stud 10, which is mounted in the head of a carrier 8, which carrier is secured to a rock shaft 29.

Figure 2 shows the cutting mechanism in inoperative position with the latch dog 9 in its normal retracted or disconnected position. A constantly oscillating member 11 with which the dog is adapted to co-operate, is carried by a lever arm 12, which swings about a spindle 15 mounted in bearings 13, 14 on the frame element or bracket 4. About the same axis or spindle there is also fulcrumed a lever arm 16, which is rigidly connected with the lever arm 12, or which may be formed integral with the lever 12. The lever arm 16 is provided at its end with a spherical pin 17 which is embraced by the head 18 of an eccentric rod 19. The eccentric strap 20 of the rod 19 embraces an eccentric 21 secured to a shaft 22 which is journaled in the machine base 1. Thus when the shaft 22 rotates, the lever arms 16 and 12 with the member 11 are caused to oscillate constantly by means of the eccentric drive. The coupling members 9 and 11 have opposed tongues or projections 53, 54, which can be brought into engagement for the purpose of operatively coupling the movable blade with the lever 12, i. e., to render the cutting mechanism operable. This coupling or connecting step is effected under the control of an engaging member or detector 23, which can rise and fall under the influence of the articles passing beneath it and which is capable of moving down into an opening in the needle plate 39 of the machine. If the engaging member 23 rises, the cutting mechanism is first coupled and then immediately uncoupled again, and if, on the other hand, it falls, the cutting mechanism is likewise first coupled and then uncoupled. The engaging member 23 is adjustably secured on its carrying element 24, and the latter is adjustably secured to the end of a lever arm 25. The engaging member 23 is preferably formed as a shoe with a flat center portion or sole and upwardly inclined ends. By suitably adjusting the position of the engaging member 23 in the direction of feed, the timing of the coupling can be made earlier or later. The magnitude of the acute angles formed by the upwardly inclined ends of the engaging member relative to the horizontal have some influence on the timing of the coupling step. These angles are preferably made not too acute and not too obtuse. The correct value can be found by experiment. The adjustability of the engaging member 23 on the carrier 24, and of the carrier on the lever arm 25, permits easy, and thus rapid, correct setting of said member both horizontally and vertically.

The lever arm 25 is yoked as at 26 to straddle

the block 4, with the arms 27, 28 of the yoke freely engaging the rock shaft 29. The yoked portion 26 of the arm 25 has an upwardly directed arm 30, which is under the influence of a spring 31 abutting against the block or pedestal 4. The spring tends to displace the arm 30 and thus also the lever arm 25 together with the engaging member 23 and holds the engaging member or detector 23 against article 32 and in the absence of any article, it displaces the member 23 into its lowest position. In order that the tension of the spring 31 may be regulated as required, a spring tensioning plate 33 is adjustably secured to the arm 30, by means of a screw 34. Further, a control cam 35 is adjustably secured to the arm 30 at one side. With this control cam 35 co-operates a feeler 36 which is secured to the coupling member 9 and constitutes a projection thereof. The coupling member 9 is in turn under the action of the spring 37, which pushes it downwards and thus keeps the feeler in permanent engagement with the control cam 35.

In Figures 3-5 is shown diagrammatically the method of operation of the cutting device. The control cam 35 is moved under the feeler 36 on the rise and fall of the engaging member 23. The lever arm 25 and the arm 30 rock about the shaft 29 during this operation, the surface of the control cam 35 being curved concentrically with the axis of the shaft 29. The surface of the control cam has, between the main part 35a and the end part 35c, a small offset in the form of a trough-like recess or depression 35b. As long as the feeler 36 slides on the high parts of the cam, the coupling member 9 is held out of the path of the constantly oscillating member 11. During this time, either an article 32 is beneath the engaging member 23 (Fig. 3), when the part 35a of the control cam will cooperate with the feeler 36; or alternatively, the engaging member has reached its lowest position, in which, according to the present invention, the cutting device is likewise disengaged, with the part 35c of the control cam in engagement with the feeler 36. Between these two positions, there exists a zone 38, represented by the angle α in Fig. 4, in which the coupling parts 9 and 11 come into engagement. The extent of the zone 38 is a function of and is directly dependent upon the arcuate length of the recess 35b. Thus, if the feeler 36 passes into the recess 35b on the control cam, then it thereby allows the tongue 53 of the coupling part 9 to move into engagement with the tongue 54 of the coupling part 11, whereby the cutting device is coupled, i. e., rendered operative to sever the stitch chain and/or the reinforcing strip (which latter is indicated at T in Figs. 3 and 5) in advance of the article.

In Figure 3, an article is shown present in the machine upon the surface of which the sole of the engaging member 23 bears. The cutting mechanism is disconnected and idle under these conditions, because the feeler 36 is resting on the high part 35a of the control cam.

In Figure 4, on the other hand, the feeler 36 has dropped into the recess 35b after passage of the article beyond the same, and thus brought, the tongues 53 and 54 into engagement, the engaging member 23 and its sole having reached the zone 38 whereby the recess 35b has come into the range of the feeler 36. In Figure 4, it can be clearly seen that the upper limit of the zone 38 is slightly below the surface of the needle plate 39.

In Figure 5, the sole of the engaging member 23 is in its lowest position with the cutting mech-

anism again uncoupled and idle. In this position, the feeler 36 rests on the high end part 35c of the control cam, and thus holds the tongues 53 and 54 out of engagement. In contrast with all the previous constructions of cutting devices of this kind, the sewing machine of the present invention will thereupon run on under no load, with the cutting mechanism idle. Thus, on the arrival of the next work piece, a few cutting strokes (one or more, depending on the length of the recess 35b in the cam 35) will again take place to sever the connecting stitching and/or strengthening strip, whereupon the parts will resume the positions in which they are illustrated in Figure 3.

The screws 40 (Fig. 2) and 41, 42 (Fig. 1) serve for fine adjustment of the coupling parts 9 and 11. The screw 43 (Fig. 2) limits the end position of the carrier 8 for the coupling part 9 into which position, after uncoupling of the cutting device, it is returned under the action of the spring 44. Thus the lift of the upper knife 6 can easily be adapted to the particular thickness of the working piece.

On the presser foot 45 (Fig. 1), there is secured a lug 46, to which a spring governor 47, 48 is flexibly or pivotally connected. The arm 47 is pressed into an almost vertical position by the action of a spring 49. Its end position is determined by a stop 50 secured on the lug 46. To the lower end of the arm 47 is flexibly or pivotally connected a stirrup member 48, which is pressed against the work plate by a spring 51. In the free end of the stirrup member 48, a stop 52 is adjustably secured.

From the foregoing it will be apparent that my improved cutting mechanism is of very simple construction and is thus very reliable in operation at high speeds.

Ordinarily two repeat strokes of the cutter at each actuation insure complete severance of the stitch chain and/or tape connecting the successive articles. However if desired or deemed necessary in practice the number of cutter strokes at each actuation may be increased by making the recess in the cam 35 correspondingly wider. Moreover, severance of the chain stitch and/or reinforcing strip, no matter how thin, is assured because the relative disposal of the cam 35 and the detector shoe 23 is such that said shoe must move below the needle plate 39 as shown in Fig. 4, before the recess 35b in said cam passes the projection or feeler 36 on the dog 9 to effect coupling for the purposes of severance, the cutting being in fact accomplished while the sole portion of said shoe traverses that portion or zone 38 of its movement below the needle plate. In this connection it is also to be noted that the detector shoe 23 is centralized with respect to the cutting plane of the knives 5 and 6 as shown in Fig. 1, with the result that the cutting of the stitch chain and/or reinforcing strip occurs at equal distances from the front and rear side edges of each article.

I claim:

1. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine; and cutting mechanism including a constantly oscillating member, a pivoted cutting instrumentality, a coupling dog pivoted on the cutting instrumentality and having a projection, a cam freely mounted on the fulcrum axis of the cutting instrumentality and having a surface with end portions and an intermediate portion at different radial dis-

tances from the axis, against which the projection of the dog rests and a detector element connected to the cam, whereby upon engagement of the detector element by each article as it passes into the machine, said cam is moved to permit the dog to momentarily enter the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of such article, and whereby upon disengagement of the detector element from such article as it leaves the machine the cam is again moved to permit the dog to momentarily enter the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain rearwardly of the article.

2. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine; and cutting mechanism including a constantly oscillating member, a pivoted cutting instrumentality, a coupling dog pivoted on the cutting instrumentality and having a projection, a cam freely mounted on the fulcrum axis of the cutting instrumentality, said cam having a surface concentric with said axis against which the projection on the dog normally rests and a recess in said surface, and a detector element connected to the cam, whereby upon engagement of said element by each article as it passes into the machine, the cam is moved in one direction so that the recess in passing the projection on the dog permits said dog to momentarily move into the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of such article, and whereby upon progression of such article beyond the detector element, the cam is moved in the opposite direction so that the recess in again passing the projection on the dog permits said dog to momentarily move into the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain rearward of the article.

3. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine; and cutting mechanism including a constantly oscillating member, a cutting instrumentality, a coupling element on the cutting instrumentality having a projection, a cam having a smooth surface against which the projection on the coupling element normally rests and a small offset in said surface, and a detector connected to the cam whereby upon engagement of the detector by each article as it enters the machine, the cam is moved in one direction so that its offset in passing the projection on the coupling element permits said element to momentarily enter the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of the article, and whereby upon progression of the article beyond the detector, the cam is moved in the opposite direction with attendant actuation of the cutting instrumentality as before as the cam offset again passes the projection on the coupling element to sever the stitch chain rearward of the article.

4. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine over the needle plate thereof; and cutting mechanism including a constantly oscillating member, a cutting instrumentality, a normally retracted coupling element on the cutting instrumentality having a projection, a cam having a smooth surface

against which the projection on the coupling element normally rests and a small offset in said surface, and a detector connected to the cam and having an article engaging portion adapted to move into the opening in the needle plate, whereby upon engagement of said engaging portion by each article as it enters the machine, the cam is moved in one direction so that its offset in passing the projection on the coupling element permits said element to momentarily enter the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of the article, and whereby upon progression of the article beyond the detector the cam is moved in the opposite direction with attendant actuation of the cutting instrumentality as before as the cam offset again passes the projection on the coupling element, to sever the stitch chain rearward of the article, the cam and the article engaging portion of the detector being relatively disposed to determine the severing while said engaging portion traverses that part of its path which lies below the needle plate.

5. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine over the needle plate thereof, and cutting mechanism including a constantly oscillating member, a pivoted cutting instrumentality, a coupling dog pivoted on the cutting instrumentality and having a projection, a cam freely mounted on the fulcrum axis of the cutting instrumentality, said cam having a surface concentric with said axis against which the projection on the element normally rests and a small offset in said surface, and a detector connected to the cam and having an article engaging portion adapted to move into the opening in the needle plate, whereby upon engagement of the detector by each article as it enters the machine the cam is moved in one direction so that its offset in passing the projection on the dog permits said dog to momentarily move into the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of the article, and whereby upon progression of the article beyond the detector the cam is moved in the opposite direction with attendant actuation of the cutting instrumentality as before as the cam offset again passes the projection on the dog, to sever the stitch chain rearward of the article, the cam and the engaging portion of the detector being relatively disposed to determine the severing in both instances while said engaging portion traverses that part of its path which lies below the needle plate.

6. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine over the needle plate thereof; and cutting mechanism including a constantly oscillating member, a cutting instrumentality, a normally retracted coupling element on the cutting instrumentality having a projection, a cam having a smooth surface against which the projection on the coupling element normally rests and a small offset in said surface, and a detector connected to the cam and having an article engaging portion in the form of a shoe with a flat bottom and ends oppositely upwardly inclined at an acute angle to the needle plate, adapted to move part way into the opening in the needle plate, whereby upon engagement of the shoe by each article as it enters the machine the cam is moved in one direction so that its off-

set in passing the projection on the coupling element permits said element to momentarily enter the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of the article, and whereby upon progression of the article beyond the shoe the cam is moved in the opposite direction with attendant actuation of the cutting instrumentality as before as the cam offset again passes the projection on the coupling element, to sever the stitch chain rearward of the article, the cam and the shoe being relatively disposed to determine the severing while said shoe traverses that part of its path which lies below the needle plate.

7. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine over the needle plate thereof; and cutting mechanism including a constantly oscillating member, a pivoted cutting instrumentality, a coupling dog pivoted on the cutting instrumentality and having a projection, a cam freely mounted on the fulcrum axis of the cutting instrumentality, said cam having a surface concentric with said axis against which the projection on the dog normally rests and a small offset in said surface, and a detector connected to the cam and having an article engaging portion in the form of a shoe with a flat bottom and ends oppositely upwardly inclined at an acute angle to the needle plate, adapted to move part way into the opening in said plate, whereby upon engagement of the shoe by each article as it enters the machine, the cam is moved so that its offset in passing the projection on the dog permits said dog to momentarily enter the path of the constantly oscillating member for actuation of the cutting instrumentality to sever the stitch chain in advance of the article, and whereby upon progression of the article beyond the shoe the cam is moved in the opposite direction with attendant actuation of the cutting instrumentality as before as its offset passes the projection on the dog to sever the stitch chain rearward of the article, the cam and the shoe being relatively disposed to determine the severing while said shoe traverses that part of its path which lies below the needle plate.

8. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine; and cutting mechanism including a constantly oscillat-

ing member, a cutting instrumentality, a coupling element having a projection, a cam engaged by the projection on the coupling element, said cam having a surface with portions thereof at different levels, and a detector connected to the cam, whereby upon engagement of the detector by each article as it enters the machine, the cam is moved to operate the coupling element for momentary coupling and actuation of the cutting instrumentality with the constantly oscillating member to sever the stitch chain a definite distance in advance of the article, and whereby upon progression of the article beyond the detector, the cam is again moved to operate the coupling element in the same manner as before for actuation of the cutting instrumentality to sever the stitch chain a definite distance rearward of the article.

9. In a sewing machine, means for producing a continuous chain of stitching on articles successively passed through the machine over the needle plate thereof; and cutting mechanism including a constantly oscillating member, a cutting instrumentality, a coupling element having a projection, a cam engaged by the projection on the coupling element, said cam having a smooth surface with a small offset therein intermediate its ends, and a detector connected to the cam, having a shoe with a flat bottom portion and with ends upwardly inclined in opposite directions at complementary acute angles relative to the needle plate, whereby upon engagement of the shoe by each article as it enters the machine the cam is moved in one direction so that its offset in passing operates the coupling element for momentary coupling of the cutting instrumentality with the constantly oscillating member to sever the stitch chain a definite distance in advance of the article, and whereby upon progression of the article beyond the shoe the cam is moved in the other direction and the coupling element is again operated in the same manner as before upon re-passing of the cam offset, to effect another coupling of the cutting instrumentality for severance of the stitch chain at a definite distance rearward of the article, the width of the cam offset and the angularity of the shoe ends being such as to determine two cutting strokes of the cutting instrumentality in quick succession at each actuation.

FRITZ LUTZ.