Feb. 26, 1946. E. POLIMAC 2,395,579

SEWING MACHINE

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Fig. 1.

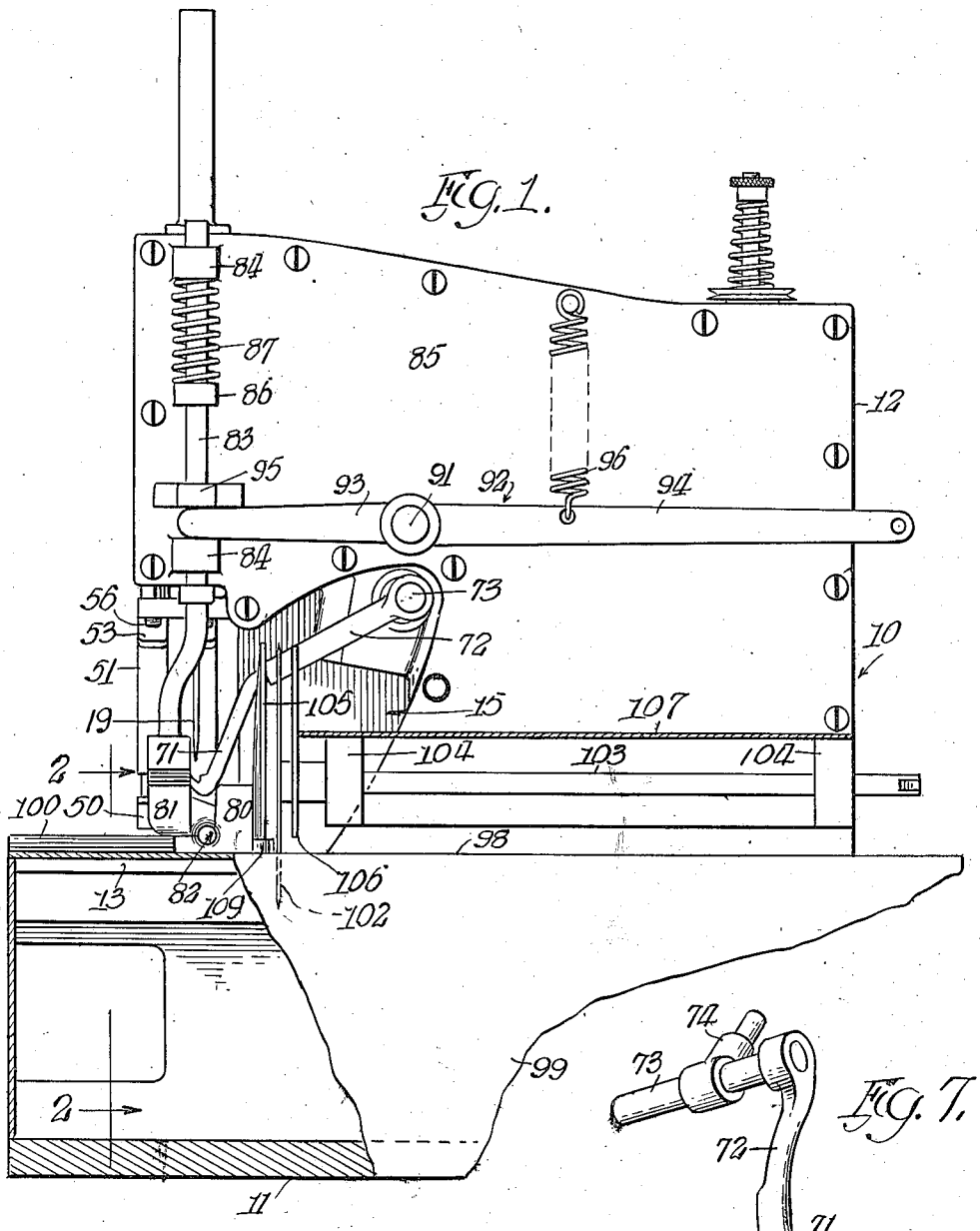


Fig. 7.

Inventor
Emeric Polimac
by Arthur W. Nelson Atty.

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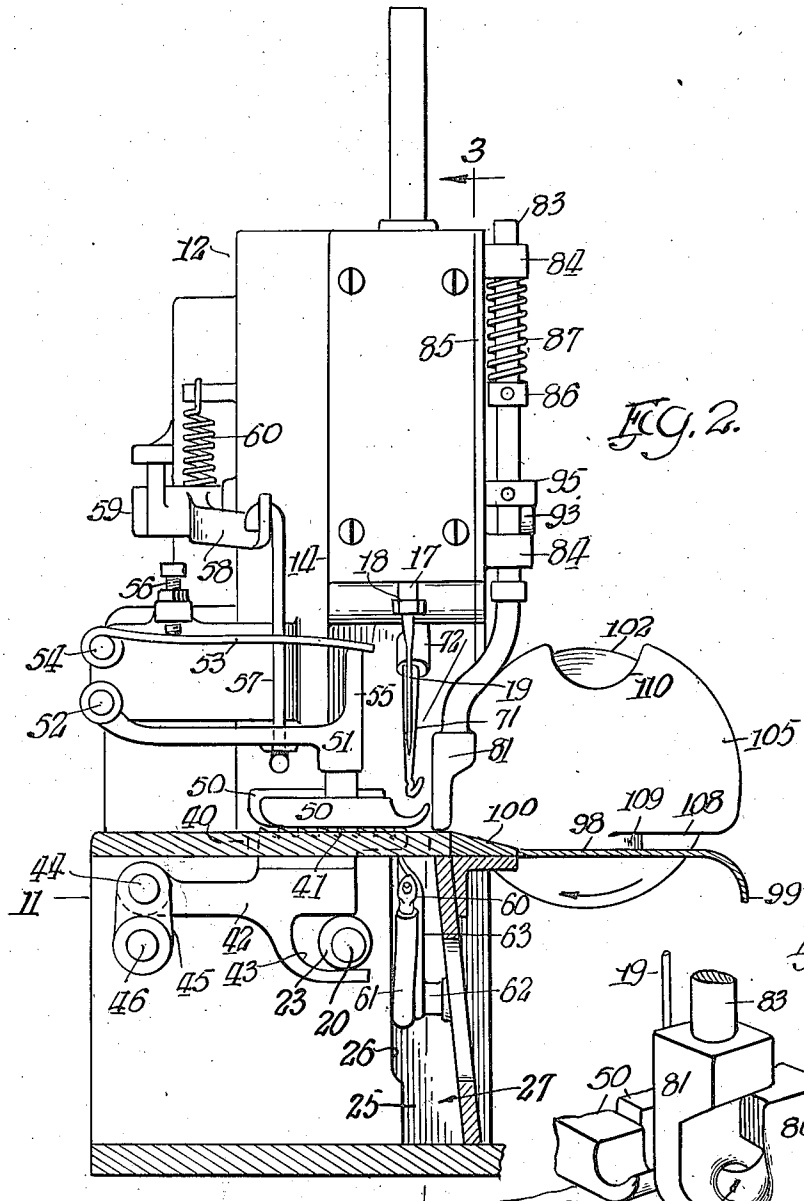


FIG. 2.

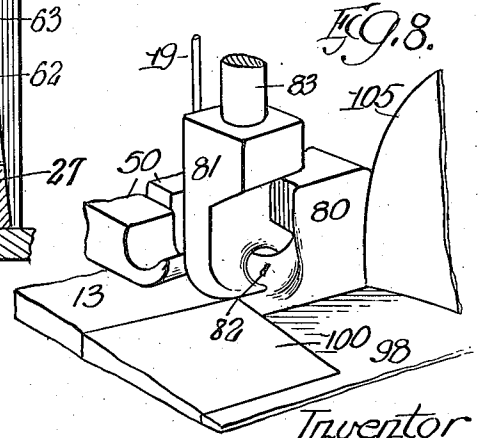


FIG. 8.

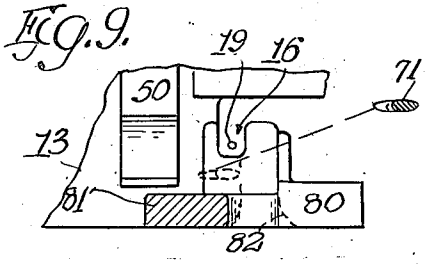


FIG. 9.

Inventor
Emeric Polimac
by Arthur W. Nelson Atty.

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Fig. 6.

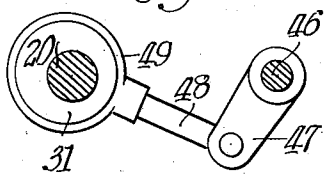


Fig. 3.

Inventor
Emeric Polimac
by Arthur W. Thelen Atty.

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Fig. 4.

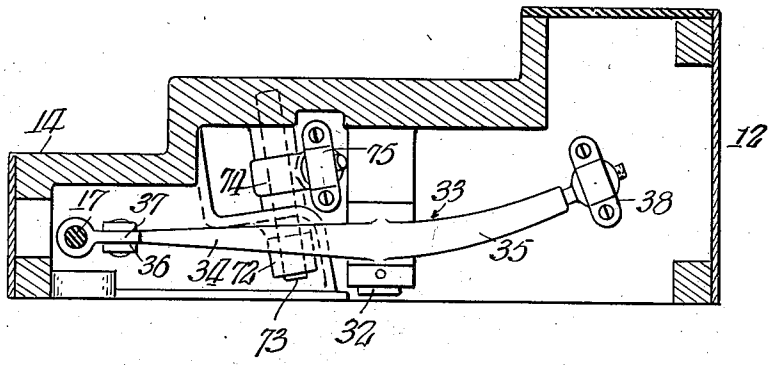
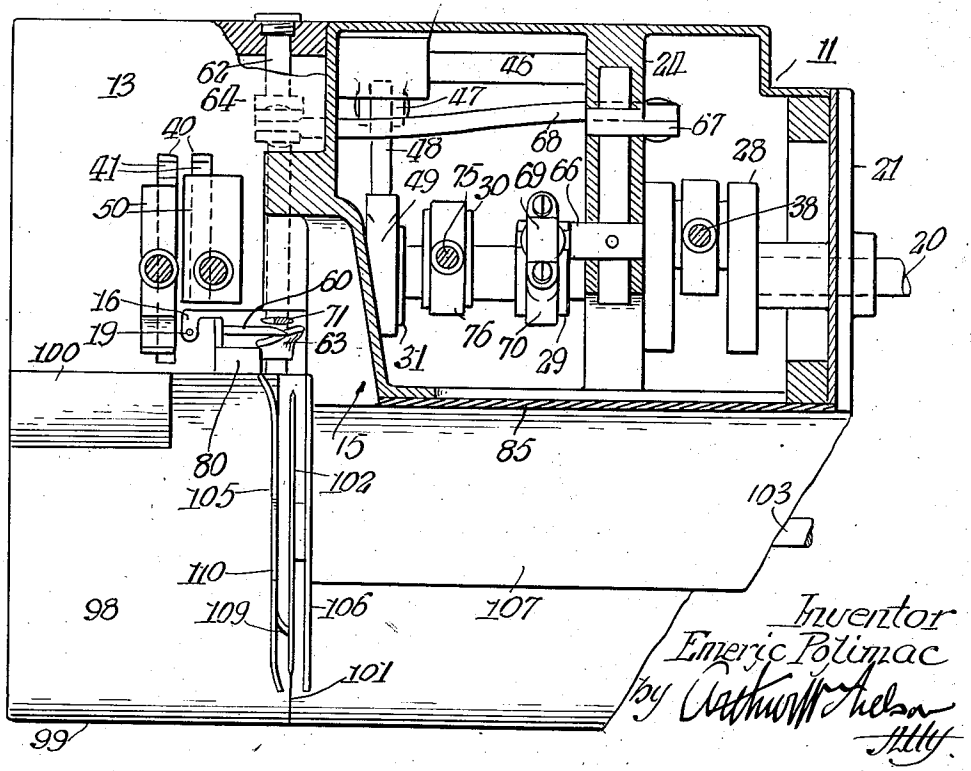


Fig. 5.



Inventor
Emeric Polimac
by Arthur M. Nelson
Atty.

Patented Feb. 26, 1946

2,395,579

UNITED STATES PATENT OFFICE

2,395,579

SEWING MACHINE

Emeric Polimac, Chicago, Ill., assignor to George I. Goldwyn and Herman Goldwyn, Chicago, Ill., copartners doing business as Goldwyn Brothers

Application October 31, 1942, Serial No. 464,050

6 Claims. (Cl. 112—162)

This invention relates to improvements in sewing machines and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The invention is especially concerned with power sewing machines for industrial use in forming an overcast or overedge stitch through cooperation between the needle and the looper and the loop spreader in the manner well known. A machine of this kind is well adapted for sewing in connection with relatively heavy material.

One of the objects of the present invention is to provide a sewing machine of the kind mentioned, which may be run at high speed and yet be economical in the use of power.

Another object of the invention is to provide a sewing machine of this kind which is devoid of gears and is quiet and vibrationless in operation.

A further object of the invention is to provide a sewing machine of this kind that includes a folder which may be disposed closer to the needle so that the material operated on is held in a better folded condition when presented to the needle and coacting stitch forming mechanism.

Also, it is an object of the invention to provide a sewing machine that includes parts so arranged as to cut a strip from the material operated upon and then fold in and overcast the margin left by the removal of the strip to provide a bound seam for the material.

The above mentioned objects of the invention, as well as others, together with the advantages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a view in front elevation of a sewing machine embodying the preferred form of the invention.

Fig. 2 is a vertical sectional view through a left hand portion of the sewing machine as taken on the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal vertical sectional view through the sewing machine as taken on the line 3—3 of Fig. 2.

Fig. 4 is a longitudinal horizontal sectional view through an upper part of the sewing machine as taken on the line 4—4 of Fig. 3.

Fig. 5 is another longitudinal horizontal sectional view through a lower part of the sewing machine as taken on the line 5—5 of Fig. 3.

Fig. 6 is a detail transverse vertical sectional view through a part of the machine on the line 6—6 of Fig. 3 and will be more fully referred to later.

Fig. 7 is a detail perspective view of a shaft and arm assembly embodied in the sewing machine and which will be more fully referred to later.

Fig. 8 is a detail perspective view of parts of the machine associated with the folder mechanism thereof and which will hereinafter be referred to.

Fig. 9 is a fragmentary detail view on an enlarged scale of parts shown in Fig. 5 and more clearly shows the path of movement of the end of the loop spreader as will be mentioned in more detail later.

Referring now in detail to that embodiment of the invention illustrated in the drawings, the improved sewing machine includes a hollow and generally upright casing or frame 10 divided into a lower part 11 and an upper part 12, as best appears in Fig. 3. At the left hand end of the casing, in substantially the horizontal plane of the junction between said upper and lower parts is a throat plate 13. The left hand portion 14 of the upper casing part 12 is made as an extension which defines a recess 15 therebelow and which overhangs a part of the throat plate 13.

In the throat plate 13 is a needle opening 16 (see Fig. 5). A vertically reciprocable needle bar 17 has guided bearing in the extension 14 and the bottom end of said bar below said extension carries a clamp 18 for securing a needle 19. This needle is so disposed with respect to the needle opening 16 as to enter and leave the same in the reciprocation of the bar.

20 indicates the main drive shaft of the sewing machine which is disposed longitudinally of the lower part 11 of the casing. The right hand end of said shaft is journalled in and projects through the associated end wall 21 of the casing part 11 so that it may have a pulley or the like (not shown) attached thereto and driven from a suitable source of power. The left hand end of said shaft is journalled in and projects through the associated end wall 22 of the casing part 11 and there has an eccentric 23 (see Fig. 2) fixed thereto and the function of which will appear later. Rising from the bottom of the casing part 11 is a boss 24 in which an intermediate part of the main drive shaft 20 also has bearing, thus providing a three point bearing for said shaft. The front part 25 of the wall 22 is offset inwardly and joins the rear part by means of a partition or bearing wall 26 and this arrangement of walls forms a recess 27 which opens into or communicates at its top end with the recess 15 in the upper portion 12 of the casing.

The shaft 20 is provided toward its right hand

end between the wall 21 and boss 24 with a counterbalanced crank 28 and between the boss 24 and wall 22, said shaft is provided with a plurality of eccentrics 29—30 and 31 respectively.

In the upper casing part 12, about midway between its right and left hand ends is a stud 32 upon which is mounted a rocking lever 33 having oppositely disposed arms 34 and 35 respectively that extend toward said ends of said casing part. The arm 34 is connected by a link 36 to a lateral extension 37 on that part of the needle bar between the top and bottom walls of the extension 14. The arm 35 of the lever 33 is operatively engaged with the top end of a connecting rod 38, the bottom end of which is operatively engaged with the crank 28. Thus in the rotation of the shaft 20, the rod 38, lever 33 and link 36 impart a vertical reciprocation to the needle bar.

In the throat plate and disposed in planes on opposite sides of the needle are slots 40 in which the feed plates 41—41 are disposed. These plates are carried upon the upper portion of the front end of a member 42 disposed below the throat plate as shown in Fig. 2. The lower portion of said front end of the member is bifurcated as at 43 to receive the eccentric 23 on the main shaft 20. The rear end of the member 42 is disposed between and is pivoted as at 44 to a pair of upright arms 45 that are fixed to that end of a rock shaft 46 that extends through the wall 22 before mentioned.

The shaft 46 is arranged parallel to but is spaced rearwardly from the main drive shaft 20. The other end of the rock shaft 46 is suitably journalled in a part of the boss 24. It is provided in the plane of the eccentric 31 with a depending arm 47 and said arm is operatively engaged by one end of a connecting rod 48. The other end of said rod carries a strap 49 engaged with the eccentric 31.

In the rotation of the main shaft, the shaft 46 is rocked through the eccentric 31, strap 49, rod 48 and arm 47 and through the arm 45, imparts a forwardly and rearwardly reciprocating movement to the member 42. Through the eccentric 23 before mentioned, the feed plate end of the member 42 is raised and lowered and this, in connection with the reciprocating movement of the member 42, imparts proper feeding movement to the feed dogs 41—41.

Associated with each feed dog is a presser foot 50 carried by the forward end of an associated supporting arm 51. The arms 51—51 are pivoted at their rear end as at 52. Each arm 51 has a tension element 53 associated therewith. The rear end of each tension element is mounted on a stud 54 while the front end thereof bears against the top end of an upright extension 55 on the front end of the associated arm 51. A screw 56 (only one of which appears in Fig. 2) is arranged to engage the mid portion of the associated tension element whereby the tension of said elements and the downward thrust or pressure of each presser foot 50 may be controlled.

Of course the presser feet must be raised or lifted to permit the passage or entrance of the material operated upon, into position between the feed plates or dogs 41 and the presser feet. Therefore, the bottom end of a lift bar 57 is engaged with the mid portion of both arms 51 and the top end of the lift bar is connected to one end of a lever 58 that is pivoted as at 59 to a stud extending from the rear of the upper portion of the casing. A spring 60 is so operatively connected to this arm as to depress that end thereof connected to the lift bar. The lever 58 is so connected to a suitable treadle (not shown) that when the treadle is depressed, the presser feet 50—50 are elevated into a position above the feed dogs or plates so that the material operated upon may be entered into position upon the throat plate between the feed plates and presser feet. After said material has been so entered, the treadle before mentioned is released and the presser feet move into operative position with respect to the feed dogs or plates and throat plate.

60 indicates a looper hook carried by an arm 61 disposed in the recess 27. This arm is fixed to the front end of a rock shaft 62 just forwardly of the wall 26 and in which a front end portion of the shaft is journalled. The rear end of said shaft is journalled in the rear wall of the lower portion of the casing. Associated with the arm 61 and disposed just forwardly thereof is a guard or deflector 63 of a cam shape formation. This guard or deflector rocks with the looper 60 and arm 61 and is so arranged with respect thereto as to be engaged by the needle in its movement so that the same is deflected out of the way of the point of the looper hook as the same swings upwardly toward the needle. Thus it is assured that the needle can at no time be struck and bent out of shape by the looper. The shaft 62 extends in a front to rear direction of the casing and toward its rear end it is provided with an upright arm 64, the purpose of which will soon appear. This arm best appears in dotted lines in Fig. 3.

65 indicates a rock shaft that is journalled in the part of the boss 24 disposed in the upper portion 12 of the casing. Front and rear arms 66—67 are fixed to this rock shaft and function as a bell crank lever.

The rear arm 67 is connected by a rod 68 to the arm 64 on the rock shaft 62. The front arm 66 is operatively engaged with the upper end of a connecting rod 69, the lower end of which carries a strap 70 that is operatively engaged with the eccentric 29. It is apparent that through the parts just above described the shaft 62 and its looper arm 61 and hook 60 are rocked from the main shaft as the latter is being driven in one direction.

71 indicates the loop spreader which is disposed substantially entirely above the lower portion 11 of the casing and substantially entirely within the recess 15 in the upper portion 12 of the casing. This spreader is secured in the bottom end of a spreader arm 72, the top end of which is fixed to that end of a rock shaft 73 which extends into said recess 15 from the inside of said upper portion 12 of the casing. The axis of the shaft 73, which is disposed in a horizontal plane, is arranged diagonally and not at a right angle to the axis of the main shaft 20. The rear end of said shaft is closer to a front to rear plane passing through the needle axis than is the front end of the shaft, as is obvious from Figs. 3 and 4. An arm 74 is fixed to the rear end of said shaft within the casing part 12 and this arm is operatively engaged by the upper end of a connecting rod 75, the lower end of which carries a strap 76 that is engaged on the eccentric 30. The assembly as constituted by the shaft 73 and arms 72—74 best appears in Fig. 7.

It is apparent that through the parts just described, the looper and the loop spreader receive a rocking movement from the main drive shaft and this movement is in timed relation with re-

spect to the needle so that they coact therewith in forming overcast stitches.

With the shaft 73 arranged at the angle before mentioned, the point or hook of the loop spreader 71 swings from a position to the rear and to the right hand side of the needle axis, to a position to the front and to the left hand side of said needle axis, as best appears in Fig. 9. This path of movement of said point of the loop spreader occurs when said point is in the bottom portion of its arc of swing and not in or toward the top portion of its arc of swing as in conventional overcast sewing machines.

In the drawings, the thread used in the sewing machine has been omitted for the purpose of clarity, it being understood that the parts are threaded substantially in the same manner as in a conventional sewing machine of this type.

On the right hand portion of the throat plate 13, in advance of the axial plane of the needle, is provided an upstanding block-like part 80 which forms the fixed part of a folder mechanism, the movable part of which is formed by a block-like foot 81 that is supported from above the throat plate, as will soon appear. The parts 80 and 81 coact to form a horizontal folder opening 82 (see Figs. 1 and 8) which extends from the front toward the rear of the throat plate. The axis of this opening is disposed adjacent but to the right hand side of the axis of the needle 19 and a part of this opening communicates with or is intersected by the needle opening 16 as appears in Fig. 5.

The folder part 81 is carried by the bottom end of an upright stem 83 which has sliding guided bearing in top and bottom ears 84 on a front or cover plate 85 for the upper portion 12 of the casing. A collar 86 is fixed to said stem between said ears and an expansion spring 87 surrounds that part of the stem between the top ear 84 and said collar. Said spring normally urges the stem downwardly so as to keep the folder block part 81 in a pressed down relation with respect to the throat plate and in operative relation with respect to the block part 80.

To elevate the block-like folder part 81 so that the material operated upon may be introduced thereunder to the feed dogs and presser feet before mentioned, I provide the following structure.

91 indicates a stud that projects forwardly from the cover plate 85. A lever 92 is pivoted on said stud and which lever comprises oppositely extending arms 93 and 94 respectively. The free end of the lever arm 93 extends toward the stem 83 and under a collar 95 fixed to said stem. The arm 94 of said lever projects laterally beyond the right hand side of the casing as a whole so as to be connected up to a foot treadle (not shown) for operation. A spring 96 is fixed at one end to the arm 94 and at its other end to a stud projecting forwardly from the front plate and this spring normally acts to swing the lever 92 counterclockwise. Thus, when the lever 92 is rocked clockwise by the treadle, before mentioned, the arm 93 by reason of its engagement with the collar 95 will raise the stem against the action of the spring 87 and lift the folder block part 81 upwardly from the throat plate to permit the passage of the material operated upon under said part 81. As soon as the treadle has been released, the spring 96 causes the lever to swing counterclockwise and until stopped by the engagement of the end of the arm 93 with the bottom ear 94 on the front plate. In this movement of the lever, the spring 87, which was previously compressed, will expand and through the collar 86 will urge the stem downwardly so that the block-like part 81 again comes into a position wherein it coacts with the block part 80 in forming the folder.

With the folder block parts 80 and 81 arranged as described, the margin of the material operated upon, as it enters the folder opening 82, is curled or turned back upon itself as a substantially tight roll or fold and due to the position of said block-like parts with respect to the needle, said roll or seam is held quite tightly in its rolled condition and cannot unroll or expand before the overcast stitching has been formed thereabout to provide a good tight rolled or folded seam.

The machine thus far mentioned has a special advantage when used in reconditioning used burlap or other bags. In some instances it may be desired to remove or trim the old seam from a bag due to its worn condition and provide a good straight edge for the bag body so that the margin of the bag body along said edge is even and smooth and can be folded or rolled to provide a new side and bottom seam for the bag.

Therefore, when a trimmer is to be used in connection with the before mentioned construction, I provide the following: At the front of the bottom portion of the casing, I provide a hollow housing that includes a top wall 98 and a front wall 99. The top wall has its top surface disposed somewhat below the top surface of the throat plate. Therefore, so that no obstruction is presented to the feed of the material operated upon as it passes from the top wall 98 to the throat plate and into the folder opening, I provide the ramp 100 best shown in Figs. 2 and 8.

In the top wall I provide a slit 101, which extends in a forwardly and rearwardly direction and which is located in a plane spaced in a right hand direction from the axis of the folder opening 82.

A thin rotary trimmer blade or disc 102 has its bottom portion extending through this slit so that the rotating edge thereof coacts with said slit in trimming a margin of the bags fed thereto. This blade or disc is fixed to one end of a horizontal shaft 103 that is journalled in brackets 104 projecting forwardly from the front or cover plate 85. This shaft may be driven in any suitable manner and preferably as it runs at high speed, it may be provided with its own driving motor.

On each side of the blade or disc I provide the guard plates 105 and 106 respectively. These are so formed and so placed with respect to the disc that the operator feeding a bag to the machine cannot engage the blade with the fingers. The guard plate 106 is made as a part of a cover 107 for the shaft 103. The front bottom portion of the plate 105 is cut away as at 108 and this forms a tongue 109, the free end edge of which substantially engages the associated side of the blade or disc. The rear bottom part of the plate is bent laterally toward the folder block part 80. Thus, when a bag is presented to the machine in the operation thereof, the blade or disc trims off a strip leaving a nice clean edge for the bag margin. As this margin is fed toward the folder, it receives a slight upward turn as it leaves the tongue and follows the face of the guard plate and is directed thereby into the folder opening 82, where it is rolled or folded over and then overcast, as is obvious. The guard plate 105 may be provided at the top with a recess 110 (see Fig. 2) whereby

sharpening means may be engaged with the periphery of the disc or blade to sharpen the same.

With the loop spreader arranged to swing, as before mentioned, it is possible to locate the cutting disc closer to the folder mechanism so that it is not necessary for the operator to hand feed the material so far before presenting it to the folder mechanism and therefore the machine operates more efficiently. Also, this arrangement permits the use of a larger diameter disc to give proper peripheral speed in cutting.

The structure described is devoid of gearing of any kind. Therefore, the structure is not only more economical to produce but it can be run at higher speeds and with less vibration and noise.

The lower part of the casing is oil tight and may contain a quantity of oil in which many of the parts run submerged. As to those parts in the upper casing part, it is pointed out that the machine contains a pressure oiling system therefor, but as this system forms no part of the present invention, it is not necessary to show or describe the same.

The machine is especially useful in trimming used burlap bags and then reseaming them in one operation.

While in describing the invention I have referred in detail to the form and arrangement of the parts involved, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim:

1. In a sewing machine, the combination of a casing, a throat plate supported thereby, a needle bar mounted for reciprocating movement toward and away from the throat plate, a rockable looper and a rockable loop spreader arranged to cooperate with the needle in forming overcast stitching, means associated with the throat plate and providing a folder mechanism with a material folding passage therethrough and having its inlet end disposed in advance of the needle, a material support disposed in advance of said throat plate, a high speed rotatable cutting disc arranged parallel with the direction of the feed of the material to said folder means and coacting with a part of said support for trimming the material operated upon as it is fed over said support to the folding means, and a guard plate for one side of said cutting disc having a part to the rear of the disc for imparting a turning motion to a marginal part of the material operated upon and for directing the same into said folder mechanism.

2. In a sewing machine, the combination of a hollow casing, a throat plate arranged outside of the casing, a main drive shaft journalled in the casing, a needle carrying bar mounted for reciprocating movement toward and away from said throat plate, a rockable looper and a rockable loop spreader arranged outside of the casing for cooperating with the needle in forming stitches, said casing having a recess extending inwardly from one side thereof above said throat plate in which said loop spreader is operatively disposed, rock shafts to which said looper and loop spreader respectively are directly attached for movement, said rock shafts being horizontally disposed with their axes at an angle to each other and to the axis of the main shaft, said loop spreader having a point which in the rocking movement of said spreader swings upwardly from the bottom of an arc from a position to the rear and to one side of the needle axis to a position to the front and to the other side of the needle axis and then returns to the first position, and means actuated from said main shaft operatively connected within the casing to said rock shafts to rock the latter.

3. In a sewing machine, the combination of a casing having upper and lower parts, a throat plate on said lower casing part, a generally upright needle carrying bar mounted in said upper casing part for reciprocating movement toward and away from said throat plate, a main drive shaft journalled in the lower casing part, a looper rock shaft journalled in said lower casing part below the throat plate, a loop spreader rock shaft journalled in the upper casing part above said throat plate, said lower casing part having a bearing wall approximately parallel to said main drive shaft, said looper rock shaft being journalled in said bearing wall below the throat plate, said rock shafts having their axes crossing the axis of the main drive shaft, said upper casing part having a recess extending inwardly from one side, said rock shafts being disposed to the same side of the plane of the needle and each having a part extending outside the associated casing part, a looper and a loop spreader respectively each fixed to one of said parts of the looper rock shaft and loop spreader rock shaft respectively extending outside of said casing parts for cooperating with the needle in forming stitches, said loop spreader being disposed and operable in said recess, and means interiorly of said casing parts and actuated from said main drive shaft operatively connected for rocking said looper and loop spreader rock shafts respectively.

4. In a sewing machine, the combination of a casing having upper and lower parts, a throat plate on said lower casing part, a generally upright needle carrying bar mounted in said upper casing part for reciprocating movement toward and away from said throat plate, a main drive shaft journalled in the lower casing part, a looper rock shaft journalled in said lower casing part below the throat plate with its axis crossing the axis of the main drive shaft, a loop spreader rock shaft journalled in the upper casing part above said throat plate with its axis crossing the axis of the main drive-shaft, said rock shafts being disposed to the same side of the plane of the needle and each having a part extending outside the associated casing part, a looper and a loop spreader respectively each fixed to one of said parts of the looper rock shaft and loop spreader rock shaft respectively extending outside of said casing parts, for cooperating with the needle in forming stitches, a bell crank, means on one of said parts journalling said bell-crank within the casing on an axis above the junction line of the parts, a driving connection from the main drive shaft to one arm of the bell crank, an arm on the looper rock shaft within the lower casing part, and a rod connected to the latter arm and remaining arm of the bell crank, an eccentric on the main drive-shaft, and an operative connection between same and said loop spreader rock-shaft.

5. In a sewing machine, the combination of a casing having upper and lower parts, a throat plate on said lower casing part, a generally upright needle carrying bar mounted in said upper casing part for reciprocating movement toward and away from said throat plate, a main drive shaft journalled in the lower casing part, a looper rock shaft journalled in said lower casing part below the throat plate with its axis crossing the axis of the main drive shaft, a loop spreader rock

shaft journalled in the upper casing part above said throat plate with its axis crossing the axis of the main drive-shaft, said rock shafts being disposed to the same side of the plane of the needle and each having a part extending outside the associated casing part, a looper and a loop spreader respectively each fixed to one of said parts of the looper rock shaft and loop spreader rock shaft respectively extending outside of said casing parts, for cooperating with the needle in forming stitches, eccentrics on said main shaft, a strap and connecting rod associated with each eccentric, means arranged between one of said connecting rods and one of said rock shafts and including a rocker arm within the casing for imparting a rocking movement to said one of said rock shafts, a bell crank journalled in one of said casing parts, one of the arms of the bell crank being operatively connected to an associated connecting rod, and the other arm of the bell crank being operatively connected within the casing to the other one of the first-mentioned rock-shafts.

6. In a sewing machine, the combination of a casing having upper and lower parts, a throat plate on said lower casing part, a generally upright needle carrying bar mounted in said upper casing part for reciprocating movement toward and away from the throat plate with its axis crossing the axis of the main drive shaft, a main drive shaft journalled in said lower casing part, a bearing wall on said lower casing part approximately parallel to said shaft, a looper rock shaft journalled in said bearing wall below the throat plate, a recess above the throat plate extending inwardly from one side of the upper casing part, an inner wall in said recess, a loop spreader rock shaft journalled in said inner wall, said rock shafts being arranged substantially at a right angle to the main drive shaft and disposed to the same side of the plane of the needle and each having a part extending outside the associated casing part, a looper and a loop spreader respectively each fixed to one of said parts of the looper rock shaft and loop spreader rock shaft respectively extending outside of said casing parts for cooperating with the needle in forming stitches, a rocking lever in the upper part of the casing and connected to said needle carrying bar, upright eccentrics within the casing on said main drive shaft and each having a strap and a connecting rod associated therewith, there being an eccentric for each of the before mentioned rock shafts and one for said rocking lever, and means within the casing operatively connecting said connecting rods with said rock shafts and said rocking lever respectively.

EMERIC POLIMAC.