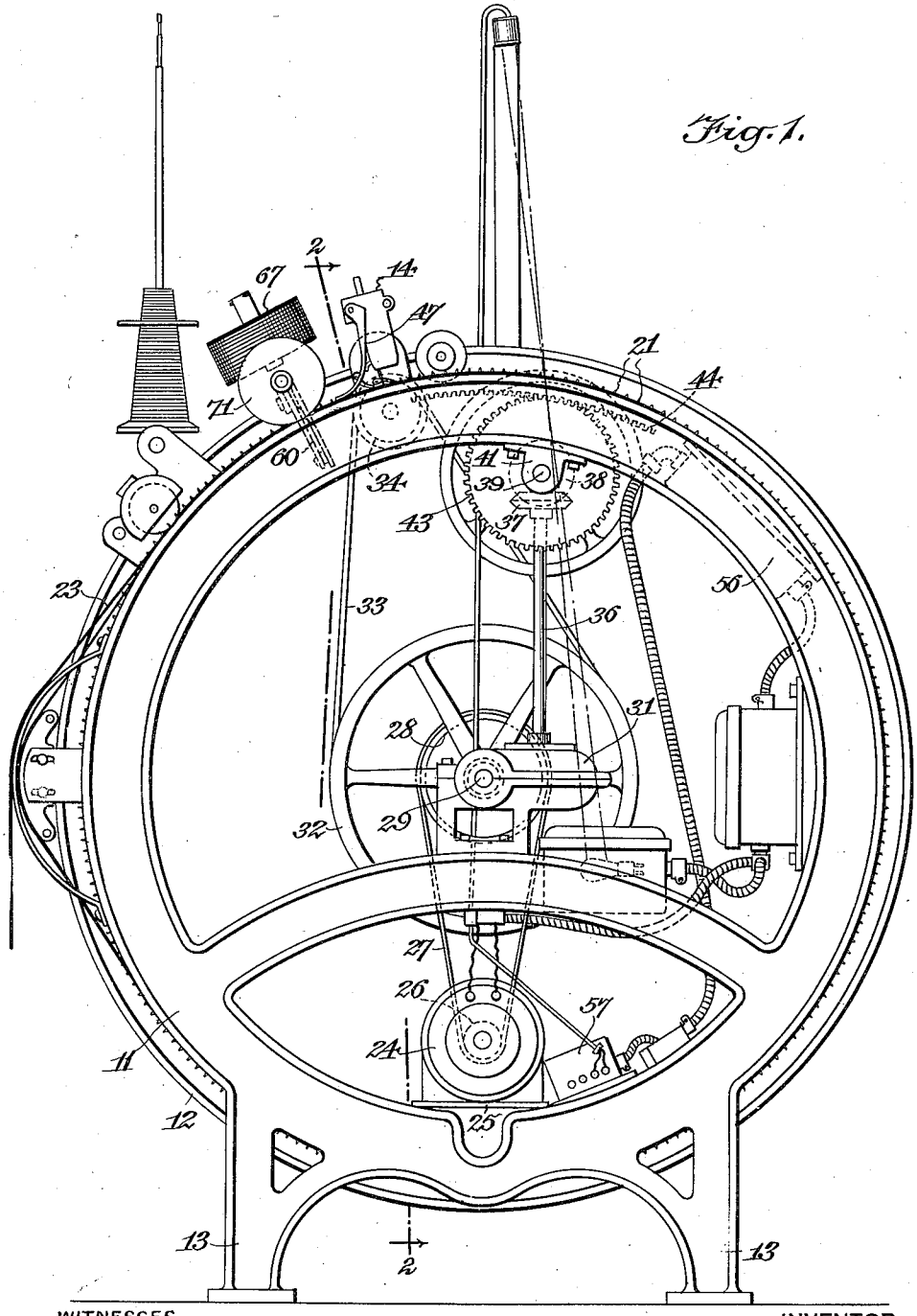
Nov. 17, 1936. M. W. McCULLOH 2,061,432

SEWING MACHINE WITH AUTOMATIC THREAD CUTTER

Original Filed Aug. 30, 1935 3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

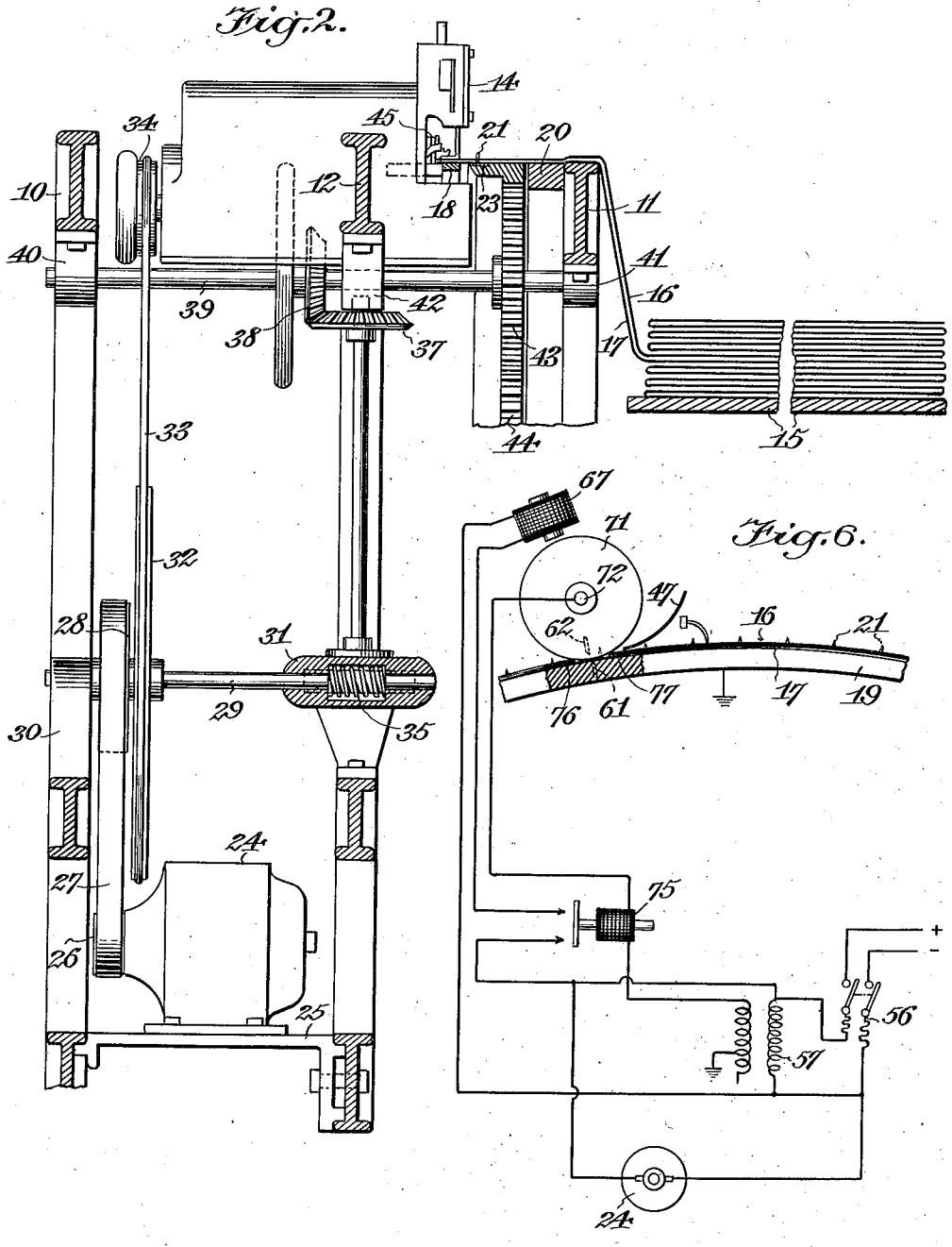


Fig. 6.

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Fig. 3.

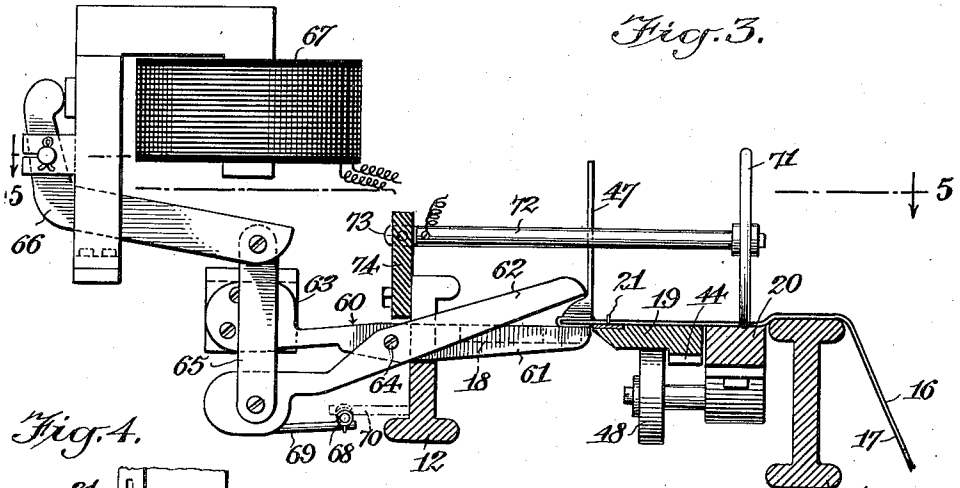


Fig. 4.

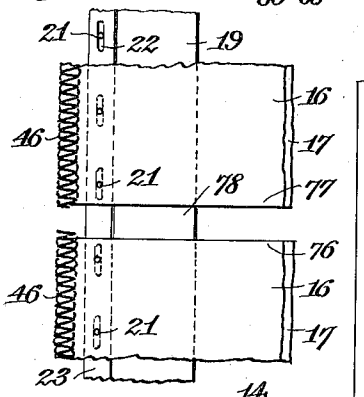


Fig. 5.

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Patented Nov. 17, 1936 2,061,432

UNITED STATES PATENT OFFICE

2,061,432

SEWING MACHINE WITH AUTOMATIC THREAD CUTTER

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Original application August 30, 1935, Serial No. 38,642. Divided and this application January 9, 1936, Serial No. 58,266

3 Claims. (Cl. 112—252)

This invention relates to a mechanism for cutting thread and controlling the operation of a sewing machine, a division of the subject matter of my pending application, Serial No. 38,642, filed August 30, 1935. More specifically, the invention relates to a mechanism which is controlled by the movement of material being sewn by a sewing machine so as to cut the sewing thread between successive pieces of the material being sewn and to cut the thread in such a way as not to leave an undesirably long end.

It is to be understood that the present invention may be employed in conjunction with sewing machines which perform various kinds of sewing and in order to facilitate and expedite the sewing, stitching and seaming of materials, and also to increase the capacity of a machine of this character.

A further object of the invention is the provision of an apparatus for continuously sewing separate pieces of material together in succession and cutting the sewing thread between the sewn pieces, and in which the operation will be automatic in response to the application of separate pieces of material or cloth on suitable means forming a part of the machine or apparatus by an operator.

With the foregoing and other objects in view the invention resides in the various combinations, construction and operation of the parts as hereinafter described and claimed, and as illustrated in the accompanying drawings, in which—

Figure 1 is a side view of an overseamer selected to illustrate the invention applied thereto;

Figure 2 is an enlarged section taken on the line 2—2 of Figure 1, and looking in the direction indicated by the arrows;

Figure 3 is an enlarged transverse section showing certain features, the section being taken approximately on the line 3—3 of Figure 5;

Figure 4 is a fragmentary plan view showing the separate pieces of cloth as retained and overseamed, and the thread having been cut between said pieces;

Figure 5 is a fragmentary plan view showing certain features and their relation to each other;

Figure 6 is a diagrammatic view showing certain features of the invention.

In the present instance, by way of example, there are shown in the drawings certain features of an overseamer involved in connection with the present invention. This overseamer is of a type which is used advantageously in bleacheries for sewing together pieces of cloth to make a continuous piece or lot of the desired number of yarns. While the invention is hereinafter described in connection with a machine of this character it is to be understood that the invention is not restricted to such use but that the invention may be used in conjunction with other closely analogous machines.

Referring now more particularly to the drawings, it will be apparent that the machine or apparatus includes stationary frames, there being two outside frames 10 and 11 respectively, and a middle frame 12. The frames 10 and 11 are circular except for the feet 13, and the middle frame 12 is circular. The sewing machine 14 is supported by the frame 12 transversely of the frames. In the present instance, this machine 14 is equipped for producing an overseam on adjacent edges of two separate pieces of cloth to secure them together, the said pieces being arranged preparatory to the sewing operation in a pile on a bench 15 beside the machine. These separate pieces of cloth are designated 16 and 17 and appear in Figure 2 of the drawings. During the sewing operation, the pile moves along the bench 15. A spacer 18, pin wheel 19 and a spacer 20 in the order named are arranged between the middle frame 12 and the outside frame 11. The spacers 18 and 20 are arcuate, the radius thereof being substantially equal to that of the wheel 19, and of slightly less radius than the outside frame 11, as shown most clearly in Figures 2 and 3. The spacers 18 and 20 are stationary. The wheel 19 has radial pins 21 spaced equidistantly. Each of the pins 21 extends through a slot 22 in a flexible stripper band 23 positioned normally in a groove in the wheel 19. The sewing machine 14 is driven by an electric motor 24 supported on a horizontal platform 25 secured to the frames 10 and 12. On the shaft of the motor is a pulley 26. A belt 27 encircles the pulley 26 and a pulley 28 fast on a shaft 29 supported for rotation by bearings 30 and 31 secured respectively to the frames 10 and 12. A pulley 32 is fast on the shaft 29, and a belt 33 encircles the pulley 32 and a grooved pulley 34 constituting a part of a sewing machine 14. The pin wheel 19 is driven by power taken from the shaft 29 through the intervention of a worm and worm wheel reduction 35, shaft 36, a miter gear 37 fast on the shaft 36, a miter gear 38 which meshes with the gear 37, said gear 32 being fast on a shaft 39. The shaft 39 is supported for rotation by bearings 40, 41, and 42 respectively, on the frames 10, 11 and 12. The shaft 36 is supported by the bearings 31 and 42. A gear 43 fast on the shaft 39 meshes with an internal gear 44 on the

inside of the pin wheel 19. It will therefore be obvious that when the motor 24 is in operation, the sewing machine 14 will be operating and at the same time the pin wheel 19 will be rotating in a counter-clockwise direction when viewed from the side of the apparatus shown in Figure 1.

The pieces of cloth 16 and 17 are brought together by the operator and are impaled on certain of the pins 21 of the wheel 19. These pieces 16 and 17 extend inwardly over the frame 11, spacer 20, wheel 19, and the spacer 18. Pieces of cloth are trimmed from their edges by trimming knife 45 connected with the sewing machine 14. This knife 45 clearly appears in Figures 2 and 5. The pieces of cloth are trimmed back to a point to be operated on by the sewing machine 14 to overseam the edges thereof as at 46 to secure the pieces to each other. A guide 47 on the machine 14 keeps the seamed edges of the cloth moving without deviation from a predetermined path to properly feed the same for the thread cutting operation to be hereinafter described. The pin wheel 19 is mounted for rotation on suitable rollers 48 mounted on the stationary spacer 20.

A supply circuit includes the motor 24, a motor starting switch and overload relay 56, a transformer 57, and the switch of the relay 55.

In order to cut the sewing thread between successive pieces of material sewed by the machine 14, in response to the movement of the material, there is provided in accordance with the invention means as follows. A suitable thread cutter is arranged beyond the sewing machine 14. In the present instance, the cutter consists of scissors 60 consisting of blades 61 and 62 respectively, the former being fixed to a bracket 63 connected with the head of the machine 14, and the latter being pivotally connected as at 64 with the blade 61. One end of the blade 62 is connected by a link 65 with a pivoted armature 66 of an electro-magnet 67 mounted on the frame 10. A contractile coil spring 68 has one end thereof connected with a pin 69 on the blade 62 and its other end connected as at 70 with the frame 12. The spring 68 maintains desirable tension on the blade 62 so that it will properly cooperate with the blade 61 to produce the cutting action. A contact wheel 71 of brass is mounted for rotation on one end of a brass rod 72, the other end of said rod being pivoted as at 73 to fiber insulator 74 secured to the middle frame 12. The wheel 71 is disposed over the spacer 20 to roll into and out of contact therewith in a manner and for a purpose which will appear. The spacer 20 and the contact wheel 71 and its rod 72 constitute a switch for the purpose of energizing and de-energizing the electromagnet 67 to operate the scissors 60 in response to the movement of the material being sewn. A circuit includes the stationary spacer 20, the wheel 71 and its rod 72, the coil of a cutter relay 75 and the secondary winding of the transformer 57. The supply circuit includes the coil of the electro-magnet 67, and the switch of the relay 75.

The operation of the apparatus is as follows. An operator arranges the ends of two separate pieces of material such as the pieces of cloth 16 and 17, so as to overlie the spacer 18, wheel 19, spacer 20, and frame 11. The motor 24 is started causing the operation of the sewing machine 14 through the intervention of the pulleys 26, 28 and belt 27, and the pulleys 32 and 34 and the belt 33. The cloth which is pinned to the wheel 19 by reason of the pins 21 is fed by the wheel 19 which is caused to rotate as soon as the motor 24 starts, through the intervention of the shaft 29 connected with the pulley 28, and the reduction worm and gear 35, shaft 36, gears 37 and 38, shaft 39, and gears 43 and 44. At the same time, the knife 45 will be cutting back the edges of the pieces of cloth, so that the machine 14 may overseam the adjacent edges of the cloth as shown in Figure 5. The operator, it is to be understood, arranged other pieces of cloth in the manner hereinabove set forth in spaced relation, so that successive pieces will have their adjacent edges so disposed that a portion of the spacer 20 will be exposed between said edges, the latter being designated 76 and 77 respectively and the exposed portion 78 will be contacted by the wheel 71 as the pin wheel 19 with the pieces of cloth pinned thereto move in a counter-clockwise direction. The wheel 71 will move down off the trailing edge 76 in contact with the portion 78, thereby closing the circuit through the coil of the relay 75, secondary winding of the transformer 57 and the spacer 20 which is grounded with said winding. This will cause the switch of the relay 75 to close the circuit through the coil of the electro-magnet 67 thereby energizing it and attracting its armature 66. This will cause the movement of the blade 62 with respect to the blade 61, through the intervention of the link 65, and as a consequence the sewing material or thread will be severed at the instant the wheel 71 contacts the spacer 20. The scissors cuts the thread without leaving any long end or pigtail. The wheel 71 will encounter the leading edge 77 of the following upper piece of cloth 16, and as a consequence the coil of the relay 75 will be de-energized causing the switch of said relay to operate and open the circuit and thus de-energize the electro-magnet 67. The armature 66 under its own weight drops to its normal position and at the same time causes the link 65 to move the blade 62 to its open position. The operation is so rapid that the apparatus operates continuously. So long as the pieces of cloth are being pinned on the wheel 19 as rapidly as the apparatus can take them, the pieces of cloth are being constantly sewed and at the same time the scissors 60 operates to cut the thread between the successive pieces of cloth at the proper point, or at the gap between the successive pieces. When the operator finishes sewing a pile of cloth and wishes the last piece to be run out of the apparatus, the operator stops the motor 24 to stop the sewing machine 14.

I claim:

1. The combination with an overseam sewing machine provided with a pin wheel cloth feeder operating in a vertical plane for sewing a series of spaced pieces of cloth together with a continuous seam, of a pair of scissors positioned adjacent the highest point of said pin wheel feeder and operating in a vertical plane, said scissors extending across said seam and having one part stationary and the other part movable, an electric switch arranged so that the respective terminals thereof are normally separated by said pieces of cloth until the pieces of cloth are moved sufficiently to cause the space therebetween to be positioned opposite said switch whereupon said switch will automatically close, an electromagnet connected with the movable part of said scissors for moving the same to a closed position for cutting said seam at the space between the respective pieces of cloth, and a circuit for said electro-magnet including said electric switch.

2. The combination with a sewing machine for sewing a series of spaced pieces of cloth together with a continuous seam, said machine having a feeder wheel, of a pair of scissors operating in a plane which is radial in respect to said feeder wheel, said scissors being positioned to extend across said seam and having one part movable, an electric magnet, means connected to said movable part actuated by said magnet when energized for closing said scissors, an automatically closing electric switch positioned adjacent said feeder wheel and with the terminals thereof arranged to be normally separated by said pieces of cloth until the pieces of cloth are moved to cause the space between said pieces of cloth to be positioned opposite said terminals whereupon said terminals will automatically move into engagement, and a circuit for said magnet including said switch.

3. The combination with an overseam sewing machine for sewing a series of spaced pieces of cloth together with a continuous seam, said machine having a pin wheel feeder, of a pair of scissors operating in a plane at right angles to the plane of the wheel, said last mentioned plane being radial in respect to said wheel, said scissors being positioned to extend across said seam and having one part movable, an electric magnet having one side grounded, means connected to said movable part actuated by said magnet when energized for closing said scissors, an electric switch comprising a grounded metallic stationary member arranged near the highest point of said pin wheel feeder, a rotatable metal wheel positioned to normally contact said stationary member, and insulating means for holding said metal wheel in position, said metal wheel and said stationary member being positioned to be separated by said pieces of cloth as said pin wheel feeder functions until the pieces of cloth are moved to cause the space between the pieces of cloth to be positioned opposite said metal wheel whereupon said metal wheel will move automatically until it engages said stationary metallic member, and an insulated conductor connecting said metal wheel with the ungrounded side of said magnet.

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