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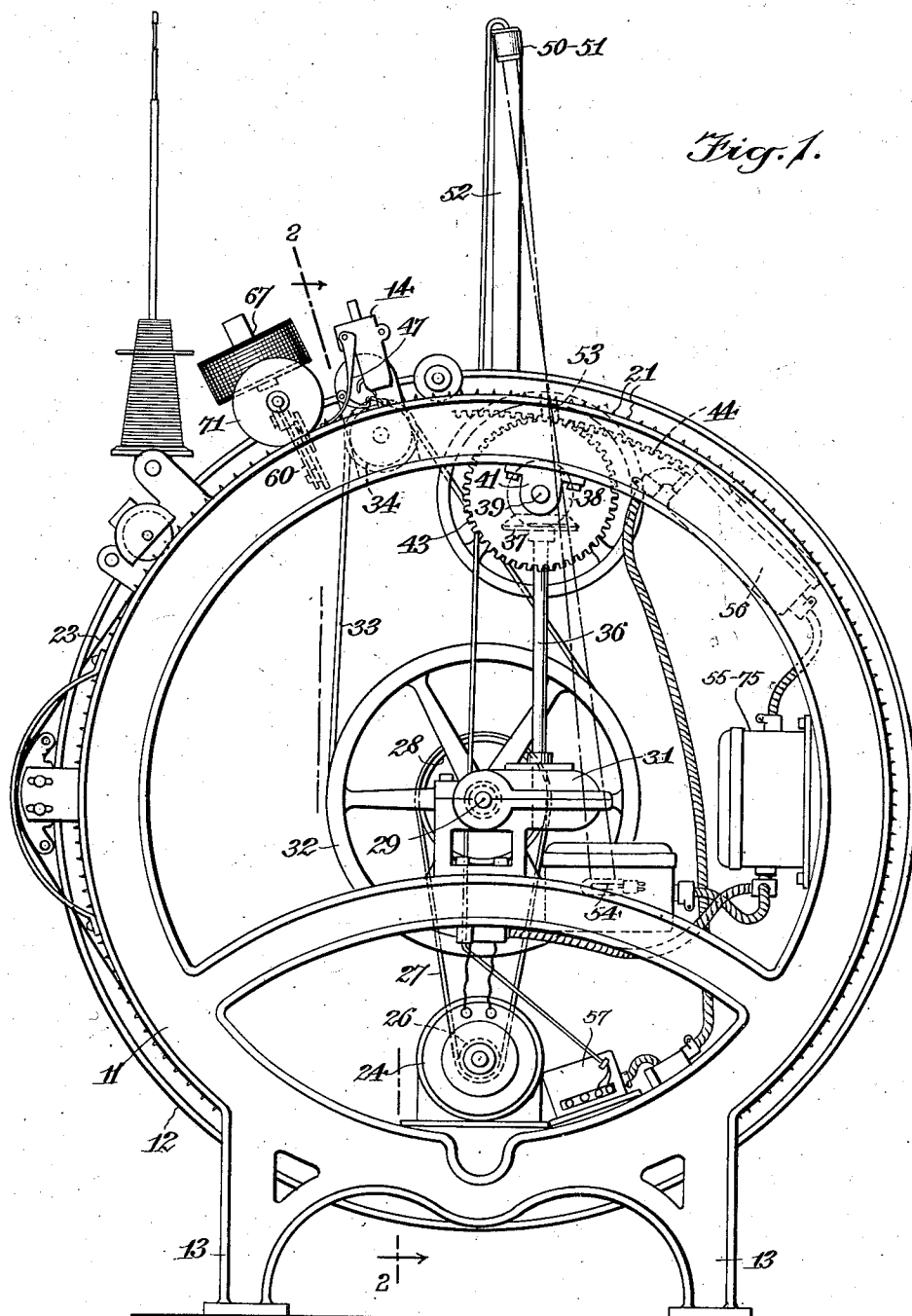
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SEWING MACHINE CONTROL MECHANISM

Filed Aug. 30, 1935

4 Sheets-Sheet 1



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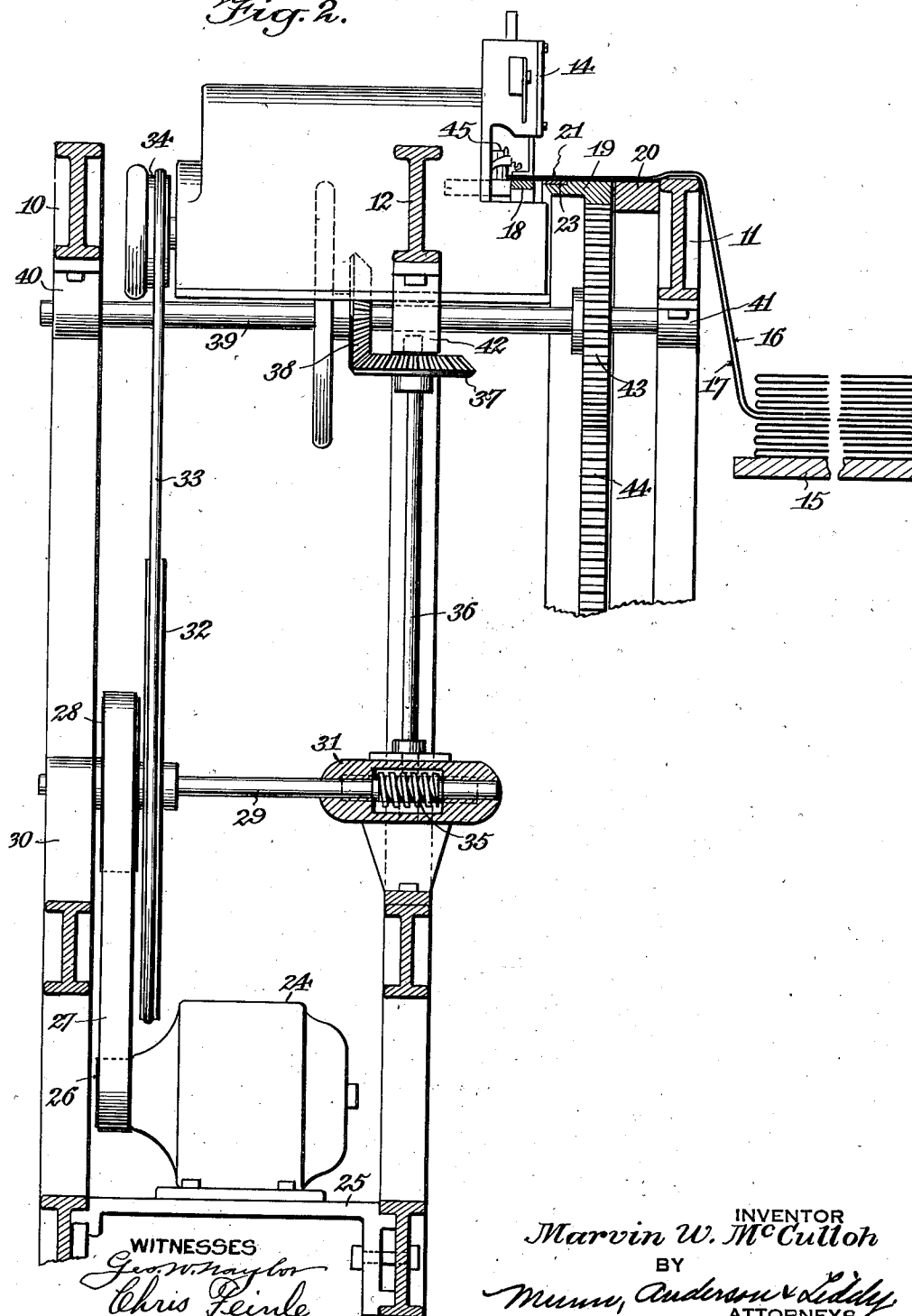
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SEWING MACHINE CONTROL MECHANISM

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Fig. 2.



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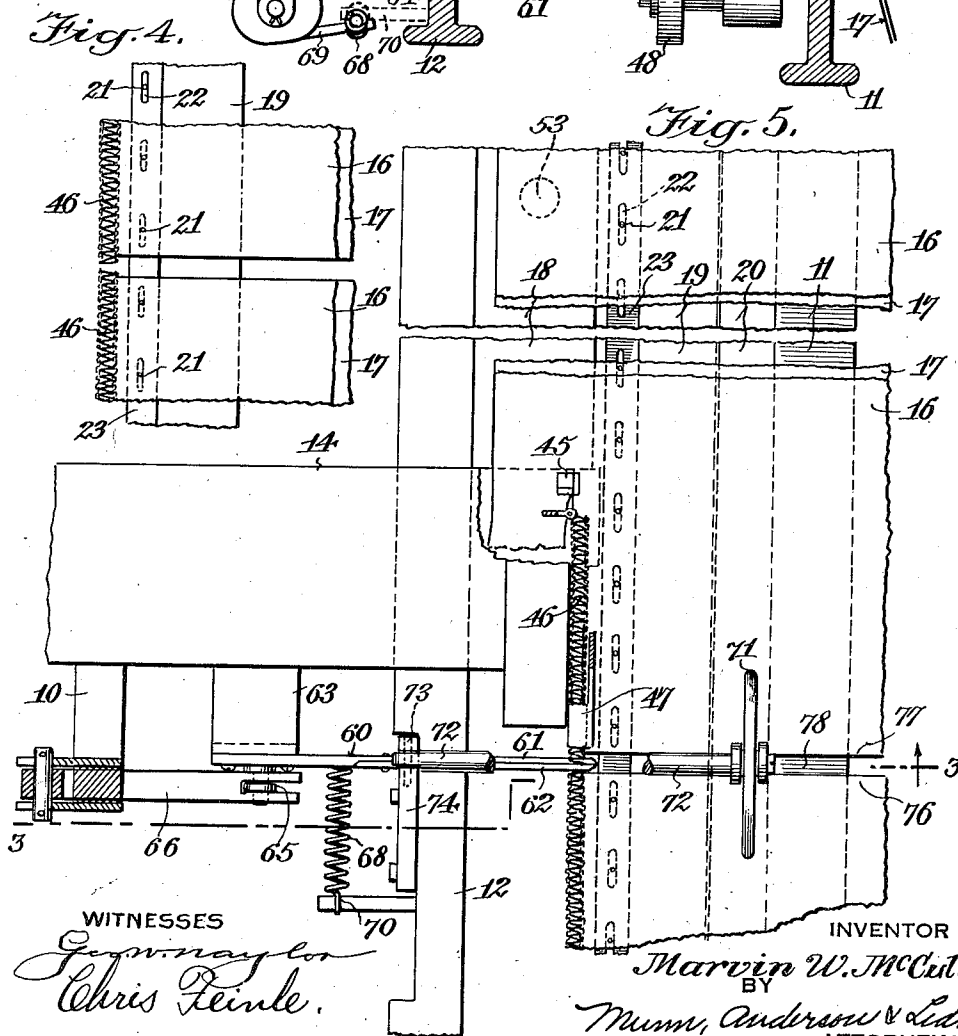
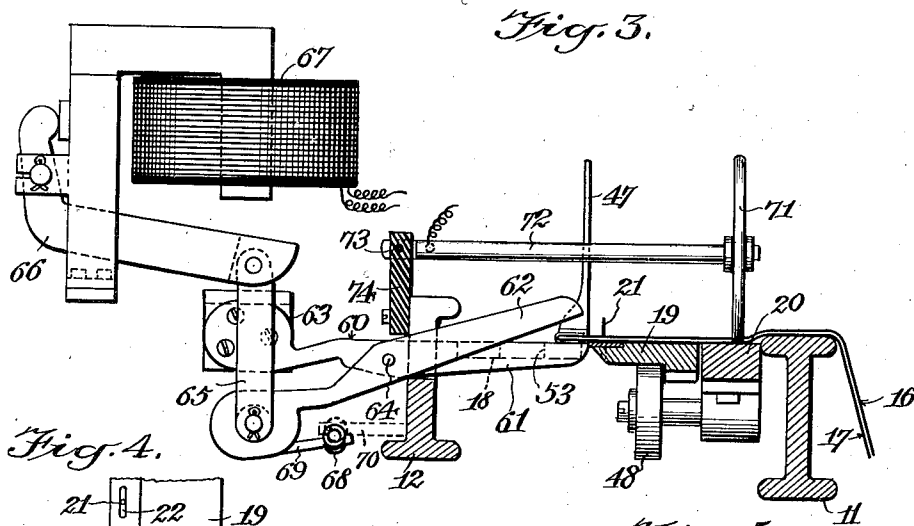
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SEWING MACHINE CONTROL MECHANISM

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4 Sheets-Sheet 3



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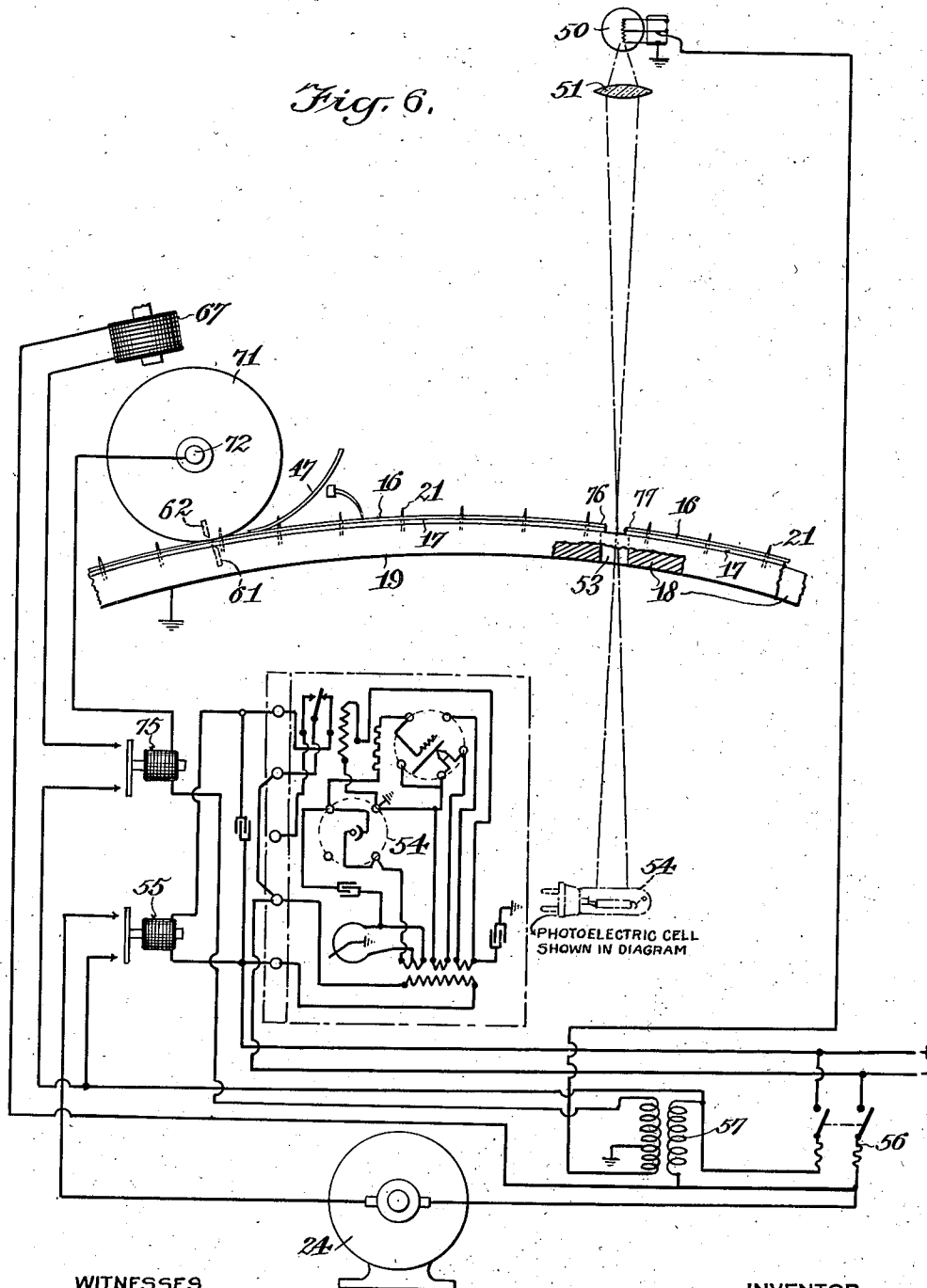
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SEWING MACHINE CONTROL MECHANISM

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4 Sheets-Sheet 4

Fig. 6.



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SEWING MACHINE CONTROL MECHANISM

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4 Claims. (Cl. 112—219)

This invention relates to a mechanism for cutting thread and controlling the operation of a sewing machine. More particularly, the invention relates to a mechanism which is controlled by the movement of material being sewn so as to automatically start and stop the operation of a sewing machine and also 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 is 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 yards. While the invention is hereinafter de-

scribed 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 the 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 38 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 counterclockwise 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.

In order to start and stop the motor 24 in response to the movement of the material or cloth being sewn there is provided in accordance with the invention means as follows. A unit consisting of an electric lamp 50, and a light condenser 51 is arranged on the upper end of a rod 52 secured in any suitable manner to the frame 12. The lamp 50 constitutes a source of light and the condenser 51 projects the light gathered from the lamp 50 downwardly through a light aperture 53 in the spacer 18. The aperture 53 is disposed at one side of the sewing machine 14 in an advance position in relation thereto. Use is made of a photo-electric cell with amplifier and relay, or any other suitable light sensitive means, the same being designated generally by the numeral 54. The cell is arranged on the frame 11 below the aperture 53 in alinement therewith so as to be affected by the light beam projected downwardly by the condenser 51. The light sensitive cell 54 is connected in a circuit which supplies the electrical energy, and said circuit also includes the coil of a motor relay 55. The supply circuit includes the motor 24, a motor starting switch and overload relay 56, a transformer 57, and the switch of the relay 55. The lamp 50 is in a circuit including the secondary winding of the transformer 57, the said lamp and winding having a ground connection with a suitable part of the apparatus.

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 provided 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 electro-magnet 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 pieces of cloth so arranged will interrupt the beam of light projected downwardly by the lens so as to prevent the beam of light from passing through the aperture 53 on the light cell 54. As a result, the relay 55 will be energized thereby closing the circuit through the motor 24 starting the latter. The operation of the motor 24 causes 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, arranges 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. When the trailing edges of the pieces of cloth clear the light aperture 53, the beam of light will affect the cell 54

to energize the relay 55, thereby shutting off the current to the motor 24, but the wheel 19 will coast enough to allow the next piece or pieces of cloth to come over the aperture 53 again interrupting the beam of light which will again start the motor 24. 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 holds one hand in such a manner as to interrupt the beam of light and keep the machine 14 running as long as may be desired to complete the sewing of the last end.

I claim:

1. The combination with a sewing machine, driving means to drive said machine and a pin wheel feeder, of a material support having a light aperture therethrough, means to project a beam of light through said aperture, a light sensitive cell at one side of said support in operative relation to said light aperture and the light, power means for actuating said driving means, and means actuated by said cell for controlling said power means, according to whether a piece of material moving along said support is obstructing or not obstructing said aperture and while the material is being sewed by said machine.

2. In an automatic sewing machine control apparatus responsive to the movement of the material being sewn, the combination of a sewing machine, a rotary material feeder, means connected with said machine and feeder to operate them, a fixed support adjacent said feeder, said support having a light aperture therethrough, means to project a beam of light through said aperture, the material fed by said feeder func-

tioning to interrupt the beam of light, a light sensitive cell affected by said light beam according to the feeding of said material, and power means actuated by said cell for controlling said first means to thereby start and stop the sewing machine and the material feeder.

3. In an automatic sewing machine control apparatus responsive to the movement of the material being sewn, the combination of a sewing machine, a rotary material feeder, means connected with said machine and feeder operable to operate the machine and to rotate the feeder, power means to operate the first means, a source of light and light sensitive means respectively on opposite sides of said feeder, so that the material carried by the feeder will either prevent light from said source reaching said cell or allow light from said source to reach the cell, said power means being actuated by said cell to control the operation of said first means to in turn control the operation of said machine and the rotation of the feeder upon the movement of the material by said feeder.

4. The combination with an overseam sewing machine having a sewing mechanism and a pin wheel feeder for moving the cloth being sewed past the sewing mechanism, a supporting spacer for supporting the edge portion of the cloth, said spacer being provided with an aperture spaced from the sewing mechanism in the direction from which the material is fed, means supported appreciably above said spacer to project a beam of light through said aperture, a light sensitive cell at one side of said spacer in operative relation to said aperture and said means, driving means for driving said sewing mechanism and said feeder, power means for actuating said driving means, and means actuated by said cell for controlling said power means according to whether a piece of material is obstructing said aperture.

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