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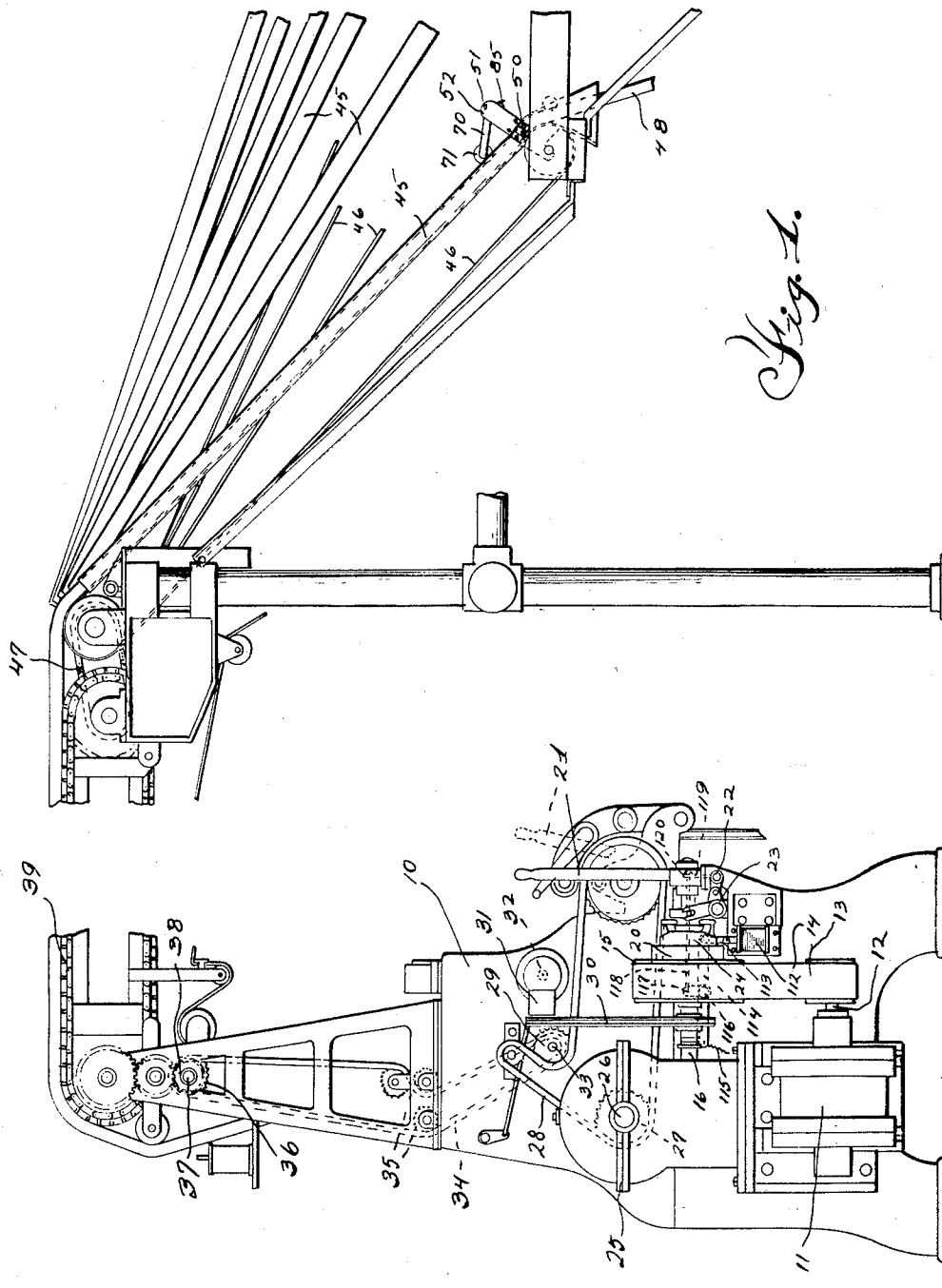
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1,948,634

BROKEN COTTON BAT DETECTOR

Filed Nov. 20, 1931

4 Sheets-Sheet 1



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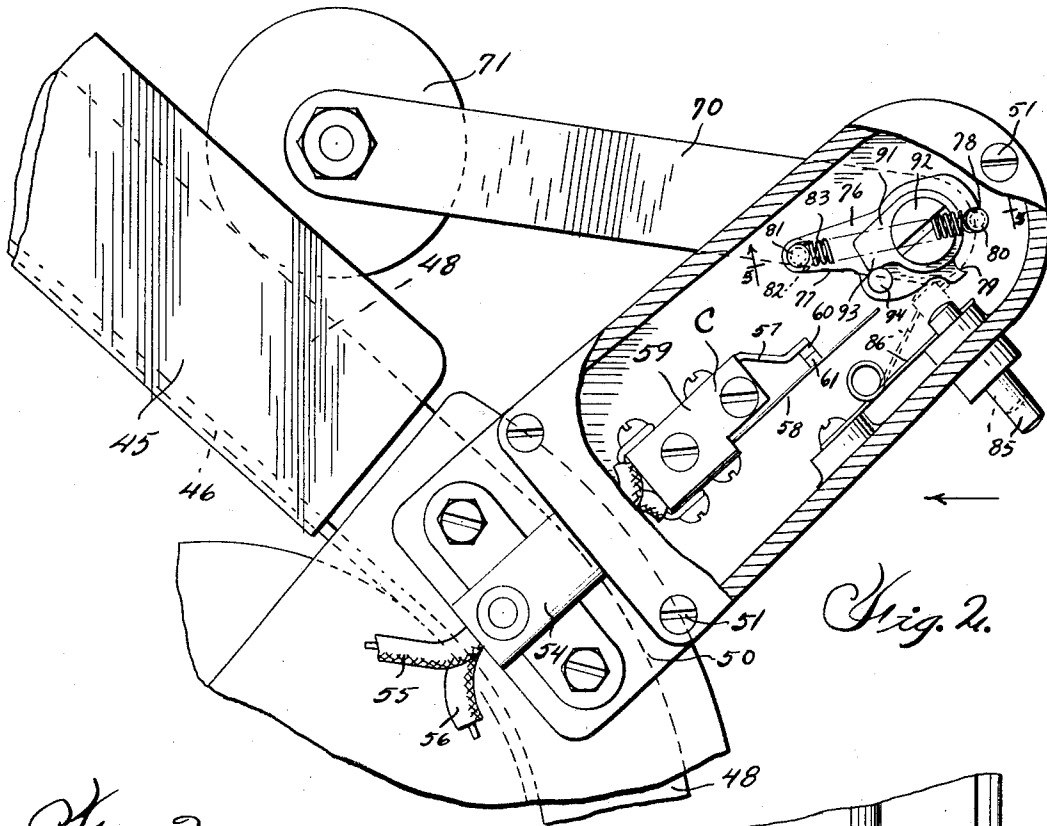
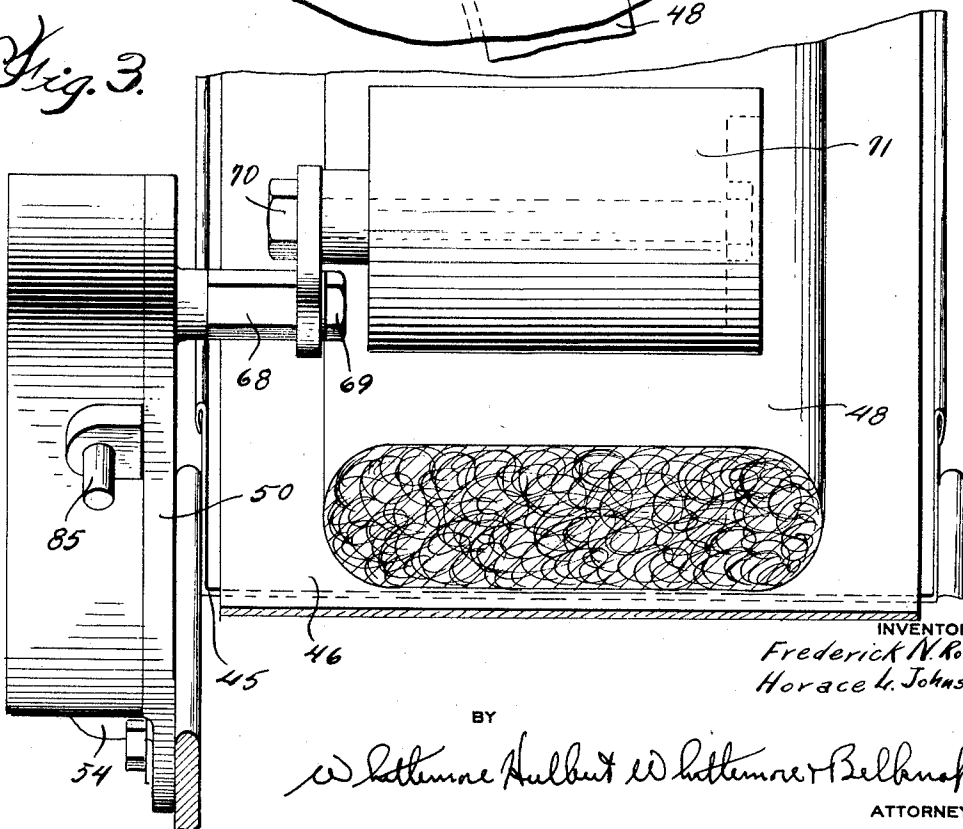


Fig. 3.



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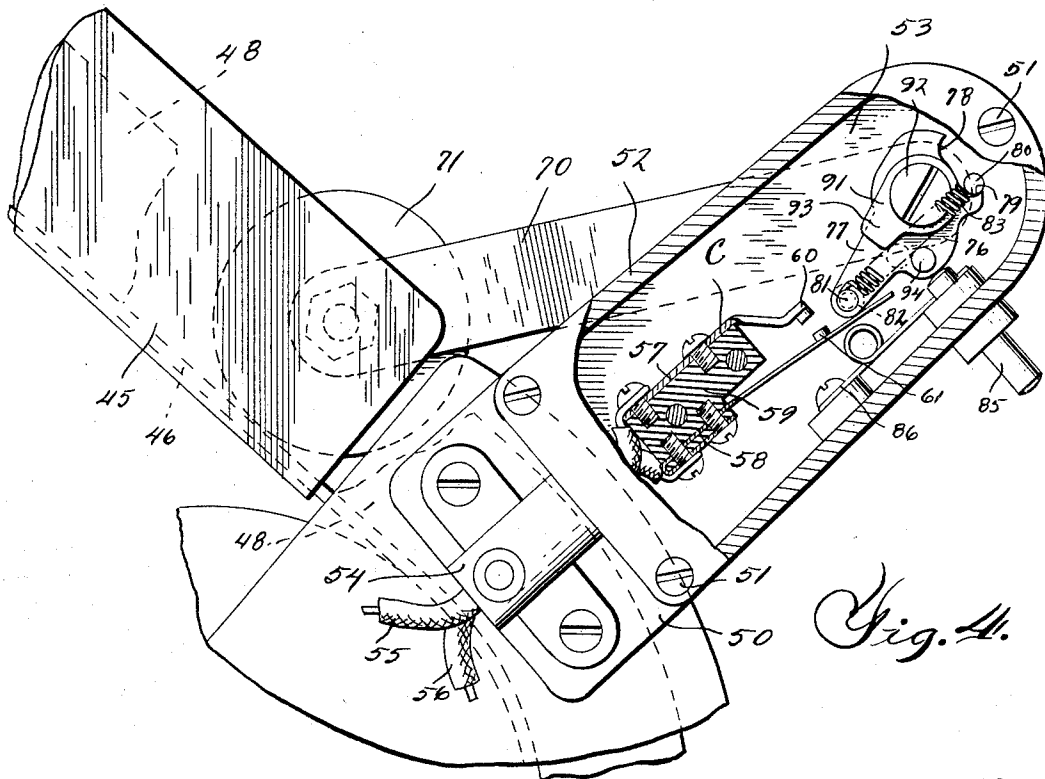


Fig. 4.

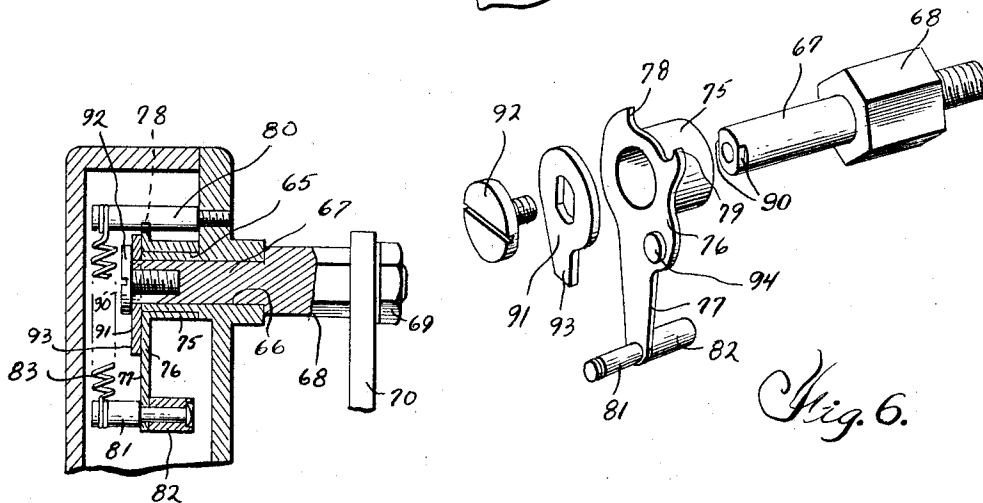


Fig. 5.

Fig. 6.

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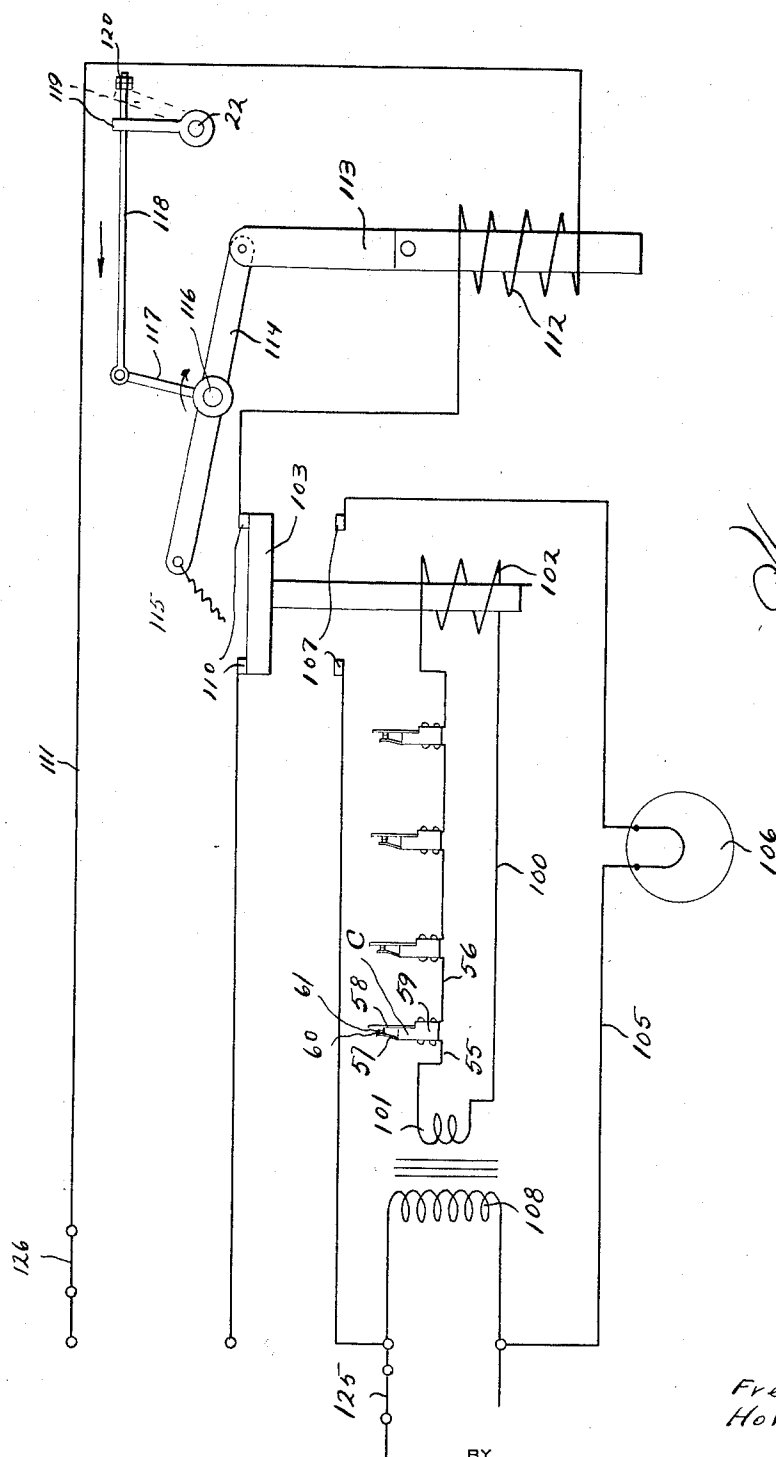
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Filed Nov. 20, 1931

4 Sheets-Sheet 4



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1,948,634

BROKEN COTTON BAT DETECTOR

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Application November 20, 1931
 Serial No. 576,374

9 Claims. (Cl. 192—127)

This invention relates to a detecting device adapted more particularly for use in connection with a cushion forming machine of the character in which strips of filling material such as cotton bat are continuously fed to positions between finish and lining fabrics and are sewed in position between these fabrics.

One of the primary objects of this invention is to provide a detecting device which will be responsive to breaking of the strips of cotton bat and which will also be responsive to predetermined decreases in the thickness of the strips of cotton bat.

The invention further contemplates the provision of an alarm which will be responsive to actuation of the detecting device and the provision of a control mechanism for the upholstery forming machine which will also be responsive to actuation of the detecting device.

Numerous other objects and advantages of this invention will become more apparent as the following description proceeds, particularly when reference is had to the accompanying drawings, wherein:

Fig. 1 is a semi-diagrammatic side elevational view of an upholstery forming machine showing a detecting device constructed in accordance with the teachings of this invention associated with the same;

Fig. 2 is an enlarged elevational view with parts broken away of the detecting device;

Fig. 3 is an elevational view of the device shown in Fig. 2, looking in the direction of the arrow;

Fig. 4 is a view similar to Fig. 2 showing a portion of the structure in section;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 2;

Fig. 6 is a perspective view of a portion of the detecting mechanism showing the parts in spaced relation to each other; and

Fig. 7 is a diagrammatic wiring diagram showing the control responsive to actuation of the detecting device.

Referring then particularly to the drawings wherein like reference characters designate corresponding parts throughout all views, there is shown in Fig. 1 of the drawings an upholstery forming machine which comprises a frame 10 on which is mounted a suitable motor 11. The motor drives a shaft 12, and engaging a pulley 13 on this shaft is a belt 14. This belt in turn engages a pulley 15 which is freely mounted on a shaft 16.

For clutching the pulley 15 to the shaft 16 there is provided a suitable clutch 20, and for

moving this clutch to engaging and disengaging positions there is provided a handle 21. This handle is arranged to rock a shaft 22, which shaft is connected by suitable links 23 to the slidable clutch part 24. The arrangement is such that when the handle is in the position shown in full lines in Fig. 1 of the drawings the clutch is disengaged, while when the handle is in the position shown in dotted lines in this figure, the clutch is in engaged position, and the shaft 16 is driven.

The shaft 16 is arranged to drive suitable reduction gearing (not shown) in a housing 25. The driven shaft of this reduction gearing is designated by the reference character 26, and fixed to this shaft is a sprocket 27 with which a chain 28 is engaged. As illustrated in Fig. 1 of the drawings, the chain 28 engages suitable sprockets fixed to suitable shafts journaled in the frame 10 for driving the several parts of the sewing machine in any desired manner (not shown).

Fixed to the shaft 16 is a sprocket with which a chain 30 is engaged, this chain driving through a suitable connection 31 a shaft 32 which in turn is connected to drive the sewing heads (not shown) of the sewing machine. Fixed to one of the shafts driven by the chain 28 such, for example, as the shaft 33, is a sprocket wheel 29, and engaging this sprocket is a chain 34 which engages suitable idler sprockets 35 and is arranged to drive a sprocket 36 on a shaft 37 journaled in the upper portion of the frame 10. Fixed to this shaft is a gear 38 which, through a suitable train of gearing, drives the conveyor numbered 39.

Suitably supported in inclined positions adjacent one side of the machine are troughs 45, and mounted for movement longitudinally of each trough is a conveying belt 46. These conveying belts are suitably driven from the conveyor 39 by a connection 47 so as to operate in synchronism with the conveyor 39.

The troughs 45 are so positioned relative to spools of cotton bat that the strips of cotton bat will be drawn upwardly along the troughs and to the conveyor 39 by which they are fed to a position where they may pass downwardly into the machine to be positioned between the layers of finish and lining fabric and to be sewed between these layers. One of these strips of cotton bat is illustrated in Fig. 1 of the drawings and is designated by the reference character 48.

All of the above construction is clearly described and illustrated in our copending applica-

tion Serial No. 515,333, filed February 12, 1931, and the above described construction therefore forms no part of the subject invention. The subject invention is, however, directed more particularly to a detecting device responsive to the thickness or the breaking of the strips of cotton bat and so arranged as to actuate a suitable alarm and to cut off the supply of power to the upholstery forming machine in the event that the strips of cotton bat decrease in thickness beyond a predetermined desired degree or become broken.

As brought out before, there are provided a plurality of troughs 45, and it will be understood that the number of these troughs provided will be dependent upon the width of the cushion being produced or, in other words, the number of strips of cotton bat to be sewed at one time. It is contemplated that one detecting device will be associated with each trough and that these detecting devices will be so connected to each other that when any one detecting device is actuated incident to a breaking or the like of the strip of cotton bat in the trough with which the detecting device is associated, the operation of the entire machine will be stopped.

Referring then more particularly to Figs. 2 to 6, inclusive, of the drawings, wherein one of the detecting devices is disclosed in detail, it will be noted that the detecting device comprises a base plate 50 which is secured to one side of its respective trough adjacent the lower end thereof. Fixed to the base plate as by screws or the like 51 is a cover plate 52 which provides a chamber 53 in which the major portion of the operating mechanism of the detecting device is mounted. The base plate is provided with a suitable boss 54 adjacent its lower end, this boss being provided with a bore for receiving electrical conductors 55 and 56, these conductors extending into the chamber 53 and being secured therein respectively to contact plates 57 and 58 secured to opposite sides of an insulating block 59.

The contact members 57 and 58 carry contact points 60 and 61, respectively, and the contact member 58 is preferably resilient so that the contact points are normally held in engagement with each other, as illustrated in Fig. 2 of the drawings. It will be understood that when these contacts are engaged, a circuit will be closed through the conductors 55 and 56, these conductors forming part of an electrical control system which will hereinafter be more fully described.

The base plate 50 is provided adjacent its upper end with a boss 65 which projects interiorly of the chamber 53, and this boss is bored as at 66 to rotatably receive the shank 67 of an actuating stem 68. Fixed to the outer end of this stem as by a nut 69 is an arm 70 which carries at its lower end a roller 71 adapted to rest upon and be held in slightly raised position by the strip of cotton bat, as clearly illustrated in Fig. 2 of the drawings.

Rotatably journaled on the boss 65 and within the chamber 53 is a sleeve 75, and fixed to this sleeve at one end thereof is a plate 76 having an extended arm 77. The plate 76 is provided at a point above the axis of the stem 68 with the spaced stops 78 and 79 which engage a pin 80 fixed to the base plate 50 and projecting interiorly of the chamber 53. It will thus be apparent that this pin limits rotative movement of the sleeve 75 and plate 76 about the boss 65.

Fixed to the end of the arm 77 is a pin 81, and rotatably journaled on this pin on one side of the arm 77 is a roller 82. A spring 83 is

secured at its one end to the pin 81 and at its other end to the pin 80 and is adapted to hold the plate 76 with either the stop 78 or the stop 79 in engagement with the pin 80. It will be noted that upon rotative movement of the plate 76 the pin 81 moves from one side to the other of the axis of the stem 68 so that the spring 83 is adapted to act on either one side or the other of the axis of rotation of the plate 76 to thus hold the plate in either of its positions of rotative movement as above brought out. It will be apparent further that the plate will be moved with a snap action to either of these positions when the plate is slightly moved to shift the spring relative to the axis of rotation of the plate.

It will be noted that when the stop 79 is engaged with the pin 80 the roller 82 engages contact member 58 to separate the contact points 60 and 61. When, however, the plate 76 is shifted to engage the stop 78 with the pin 80, the roller 82 is moved out of engagement with contact member 58, and the contact points are engaged with each other in the manner illustrated in Fig. 2 of the drawings. The plate 76 therefore constitutes an off-center actuating member for the contacts 60 and 61 and operates to snap these contacts out of engagement with each other when properly actuated.

For moving the plate 76 to a position where the contact points may be engaged with each other, there is provided a plunger 85 which is mounted for reciprocation in one of the side walls of the housing 52. A spring 86 fixed at its one end within the housing engages the plunger 85 to normally hold the same in a retracted position or out of engagement with the plate 76, as illustrated in full lines in Fig. 2 of the drawings. The plunger, however, may be depressed or forced inwardly against the tension of the spring 86 to the position shown in dotted lines in Fig. 2 of the drawings in which position it will engage the side of plate 76 to move this plate to a position where the stop 78 engages pin 80.

The shank 67 of the stem 68 is provided on its inner free end with flattened portions 90 by which a plate 91 is keyed to the end of this shank. A stud 92 threaded in the end of the stem cooperates to firmly clamp the plate 91 to the stem. The plate 91 is provided with a projecting finger 93 arranged to engage a pin 94 on the plate 76 when the roller 71 drops incident to a predetermined decrease in the thickness of the strip of cotton bat or incident to a breaking of the strip of cotton bat. Engagement of the finger 93 with the pin 94 moves the plate sufficiently to shift the spring 83 to the right hand side of the pivot of the plate 76 as viewed in Fig. 2 of the drawings, with the result that this spring causes further movement of plate 76 and causes roller 82 to engage contact 58 and break the connection between contact points 60 and 61.

As brought out before, the conductors 55 and 56 form a part of an electrical control system for controlling the supplying of power to the sewing machine and to the conveying mechanism for the cotton bat. This electrical control system is shown diagrammatically in Fig. 7 of the drawings, and by reference to this figure it will be noted that a plurality of control devices, each device being designated by the reference character C, are arranged in series, the conductors 55 and 56 of each control device forming a part of a circuit designated generally by the reference

character 100. Located in this circuit is a transformer coil 101 and a solenoid coil 102, the latter being adapted to actuate a bridge contact member 103.

the abutment 120 as illustrated in dotted lines in Fig. 7 of the drawings. With the clutch in engagement, the several shafts of the sewing machine will be operated, as will also the conveying mechanism for the cotton bat.

5 The reference character 105 designates a second circuit, and mounted in this circuit is a signal such, for example, as a lamp 106. This circuit likewise includes spaced contacts 107 arranged to be bridged by the member 103 upon a de-energization of the coil 102. Arranged in a shunt circuit of the circuit 105 is a transformer coil 108 for energizing the coil 101 and thus the circuit 100.

If, now, the cotton bat passing through any trough should break or if the thickness thereof should decrease below a predetermined desired thickness, the roller of the detecting device associated with that trough will be lowered, with the result that the finger 93 of that detecting device will engage the pin 94 to move plate 76 to a position where the spring 83 will snap the plate into engagement with the contact member 58. This will break the circuit through this particular detecting device and, since all of the detecting devices are arranged in series, breaking of the circuit through any one device will break the circuit 100.

10 When the coil 102 is energized, the member 103 is forced upwardly and is caused to bridge contacts 110 which are located in a circuit 111. Also located in this circuit is a solenoid coil 112 arranged to actuate a link 113 which is connected to one end of a lever 114. A spring 115 connected to the opposite end of the lever tends to move the same against the force exerted by the coil 112.

This will result in a de-energization of the coil 102 with the result that member 103 will drop, bridging contacts 107 and breaking the circuit 111. The bridging of contacts 107 will effect an energization of circuit 105 with the result that signal 106 will be actuated. The breaking of circuit 111 will effect a de-energization of coil 112 with the result that spring 115 will move lever 114 about its pivot to move rod 118 in the direction of the arrow in Fig. 7 of the drawings. This will move abutment 120 into engagement with arm 119 to thus rock shaft 22 to a position to effect disengagement of clutch 20.

15 The lever 114 is rotatably mounted on a shaft 116 which is suitably fixed to the frame 10 of the machine. Fixed for movement with the lever 114 is an arm 117, and pivotally connected to the free end of this arm is a rod 118 which passes loosely through an opening formed in an arm 119. This arm is rigidly fixed to the shaft 22, and the rod 118 is provided on its free end with an abutment 120 arranged to engage the arm 119 to move the latter to the position shown in full lines in Fig. 7 of the drawings when the rod 118 is moved in the direction of the arrow in this figure, incident to deenergization of the coil 112. It will thus be apparent that if the coil 112 is de-energized, the shaft 22 will be rocked by the rod 118 to effect a disengagement of the clutch 20.

Thus it will be apparent that the invention provides a series of detecting devices which are responsive to breaking of the strips of cotton bat and predetermined decreases in the thickness of the strips of cotton bat. Actuation of any one of the detecting devices will effect the actuation of a suitable alarm signal and will also effect a disengagement of the main clutch of the sewing machine with the result that the operation of the entire machine will be stopped. It will be noted that the clutch controls the supply of power not only to the cotton bat conveying mechanism but also to the other mechanism of the sewing machine including the drive shaft for the sewing heads.

20 In operation, it will be understood that prior to the starting of the machine the strips of cotton bat may be drawn up their respective troughs and threaded downwardly into the machine in position to be engaged by the mechanism by which they are located between the finish and lining fabrics and sewed between these fabrics. During this positioning of the strips of cotton bat, the rollers 71, together with the arms 70, may be swung upwardly out of the way, being limited in this movement only by engagement of the fingers 93 with the stop pins 80. The rollers may then be lowered on to their respective strips of cotton bat and the circuit 100 may be closed by pressing inwardly on the plunger 85 associated with each detecting device. It will be understood that this inward pressing of the plungers will cause the springs 83 to snap the plates 76 to positions where the stops 78 of these plates engage the pins 80. The contacts 60 and 61 will thus be allowed to close.

Upon a disengagement of the clutch incident to an actuation of any one of the detecting devices, it will be impossible to again start the actuation of the machine until the particular strip of cotton bat which is broken or which has decreased in thickness beyond the desired degree has been taken care of. When, however, the cotton bat is again threaded through the trough, the particular detecting device which has been actuated may be reset by a suitable actuation of the plunger 85 of this detecting device.

25 The circuits 105 and 111 may then be closed by suitable switches 125 and 126, respectively, with the result that circuit 100 will be energized and bridge member 103 will be forced upwardly to bridge contacts 110. This will effect a rocking of the lever 114 in the direction of the arrow in Fig. 7 of the drawings, with the result that the abutment 120 will be moved away from the arm 119 in the manner clearly illustrated in Fig. 7 of the drawings.

While the invention has been described with some detail, it is to be understood that the description is for the purposes of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

What we claim as our invention is:

30 With the abutment in this position the operation of the entire sewing machine may be started by shifting lever 21 to the position shown in dotted lines in Fig. 1 of the drawings, at which time arm 119 will be brought into engagement with

1. A detecting device of the character described including in combination a rotatably mounted plate, means including a spring connected to said plate for moving the same in either direction about its axis of rotation, and means responsive to a breaking of a strip of cotton bat fed to a sewing machine for imparting

sufficient movement to said plate to cause the same to be actuated by said spring.

2. In a detecting device of the character described, a housing, a bearing formed within said housing, a stem rotatably mounted in said bearing, a sleeve rotatably mounted on said bearing, a plate carried by said sleeve and having a projecting portion, and a member fixed to said stem and rotatable therewith arranged to engage said plate to rotate the same on its bearing.

3. In a detecting device of the character described, a housing, a bearing within said housing, a stem rotatable in said bearing, a sleeve rotatable on said bearing, a plate carried by said sleeve for rotation therewith, a spring secured to said plate and movable upon rotation of said plate to move relative to the axis of rotation of said sleeve to hold said plate in either one or the other of two positions of rotative movement, a plunger carried by said housing for moving said plate in one direction, and a member fixed to said stem for moving the plate in the other direction.

4. In a detecting device of the character described, a housing, a pair of contacts within said housing normally held in engagement with each other, a bearing within said housing, a stem journaled within said bearing, an arm fixed to said stem and operable upon breaking of a strip of cotton bat fed to a sewing machine to rotate said stem within its bearing, a sleeve journaled on said bearing, a plate carried by said sleeve and having a projection adapted upon a predetermined rotative movement of said sleeve to engage one of said contact members to separate the contact members, stops for limiting rotative movement of said sleeve, a spring movable relative to the axis of rotation of said sleeve for holding said sleeve in either one or the other of its positions of limited rotative movement, a plunger carried by said casing and engageable with said plate for moving said sleeve to one of its positions of rotative movement, a plate carried by said stem and engageable with the plate on said sleeve for moving said sleeve to the other position of its rotative movement, and control means for controlling the feeding of the strip of cotton bat controlled by the said contacts.

5. In a detecting device of the character described, a pair of contacts movable relatively into and out of engagement, an arm movable from one position to another, means for feeding work in such relation to said arm as normally to hold the arm in one of said positions, a member movable from one extreme position to another to move one of said contacts relative to the other, means operable to move said member to either extreme position when it has been moved toward the same beyond a predetermined intermediate position, and means actuated by movement of said arm to said other position to move said member toward said other extreme position and beyond said intermediate position.

6. In a detecting device of the character described, a pair of contacts normally held in en-

gagement, an arm movable from one position to another, means for feeding work in such relation to said arm as normally to hold the arm in one of said positions, a member movable from one extreme position to another to move one of said contacts away from the other, means operable to move said member to either extreme position when it has been moved toward the same beyond a predetermined intermediate position, and means actuated by movement of said arm to said other extreme position to move said member toward said other extreme position and beyond said intermediate position.

7. In a detecting device of the character described, a pair of contacts normally held in engagement, an arm movable from one position to another, means for feeding work in such relation to said arm as normally to hold the arm in one of said positions, a member movable from one extreme position to another to move one of said contacts away from the other, means actuated by movement of said arm to said other position to move said member to a predetermined intermediate position, and means operative when said member has been moved to said intermediate position to move said member to said other extreme position.

8. In a detecting device of the character described, a pair of contacts movable relatively into and out of engagement, an arm movable from one position to another, means for feeding the work in such relation to said arm as normally to hold the arm in one of said positions, a member movable from one extreme position to another to move one of said contacts relative to the other, means operable to move said member to either extreme position when it has been moved toward the same beyond a predetermined intermediate position, means actuated by movement of said arm to said other position to move said member toward said other extreme position and beyond said intermediate position, and means operable to move said member from the last mentioned toward the first mentioned extreme position.

9. In a detecting device of the character described, a pair of contacts normally held in engagement, an arm movable from one position to another, means for feeding work in such relation to said arm as normally to hold the arm in one of said positions, a member movable from one extreme position to another to move one of said contacts away from the other, means operable to move said member to either extreme position when it has been moved toward the same beyond a predetermined intermediate position, and means actuated by movement of said arm to said other position to move said member toward said other extreme position and beyond said intermediate position, and means operable to move said member from the last mentioned toward the first mentioned extreme position.

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