June 1, 1943. C. F. RANDOLPH 2,320,393

LEAF CUTTER FOR CIGAR MACHINES

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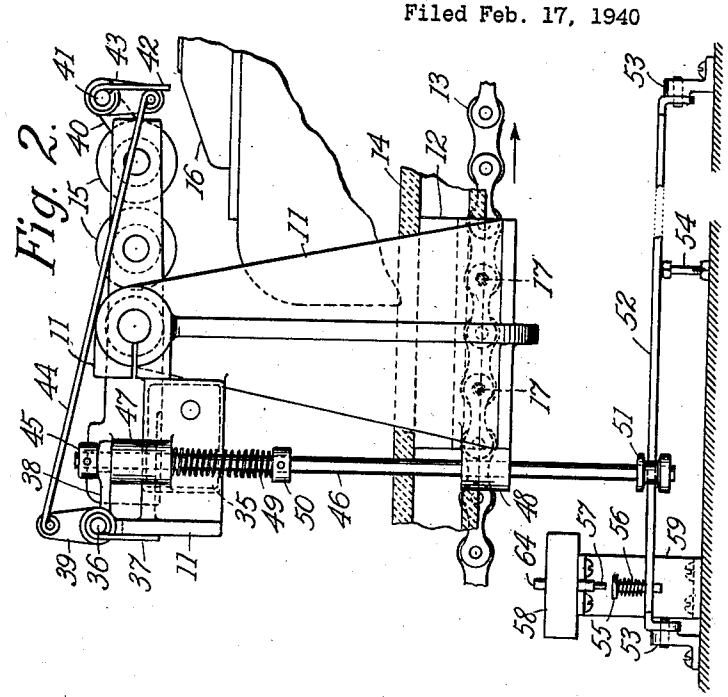


Fig. 2.

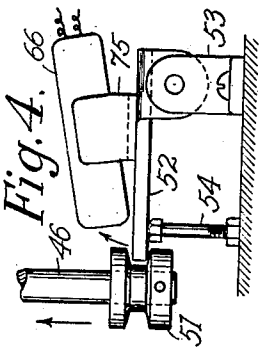


Fig. 4.

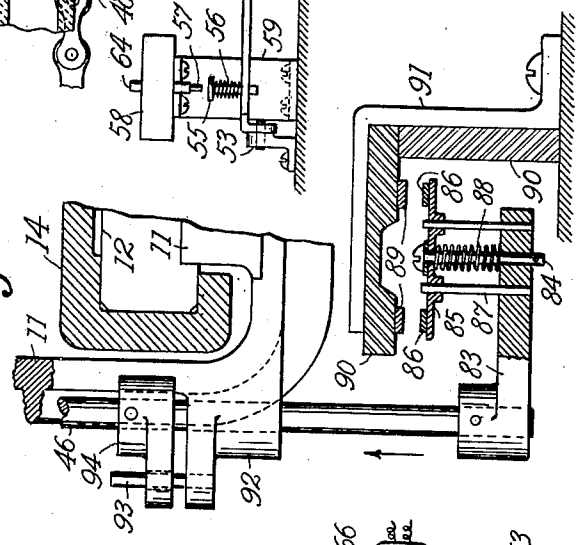


Fig. 5.

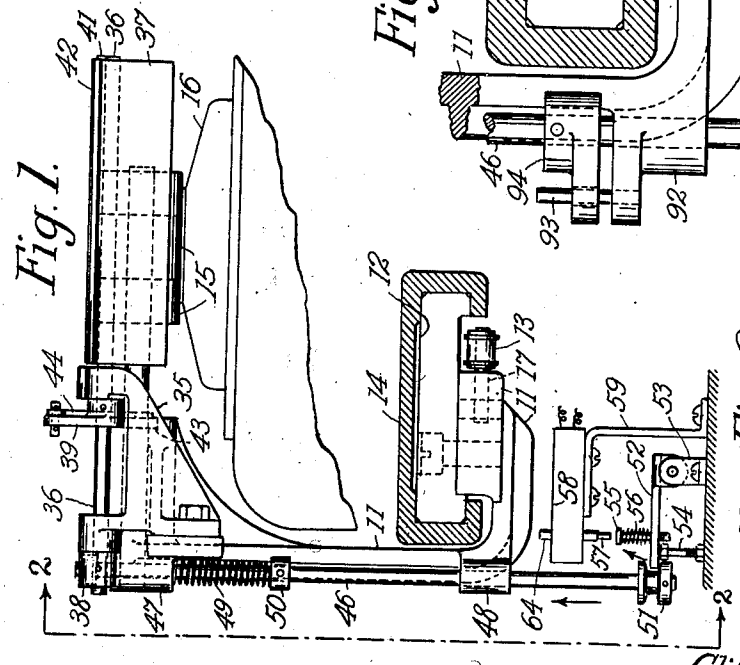


Fig. 1.

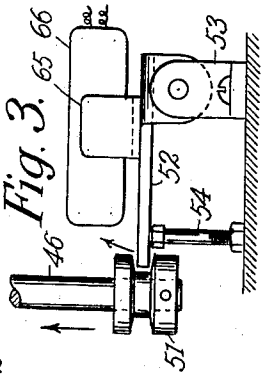


Fig. 3.

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Fig. 6.

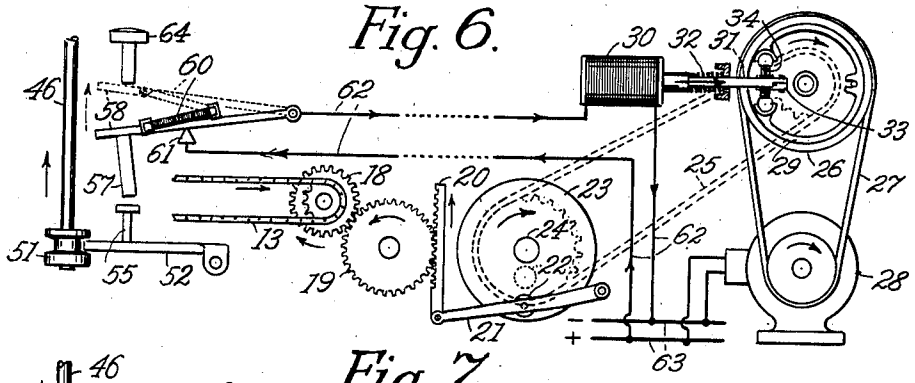


Fig. 7.

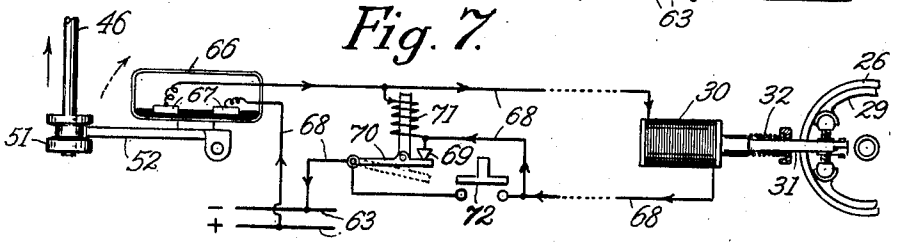


Fig. 8.

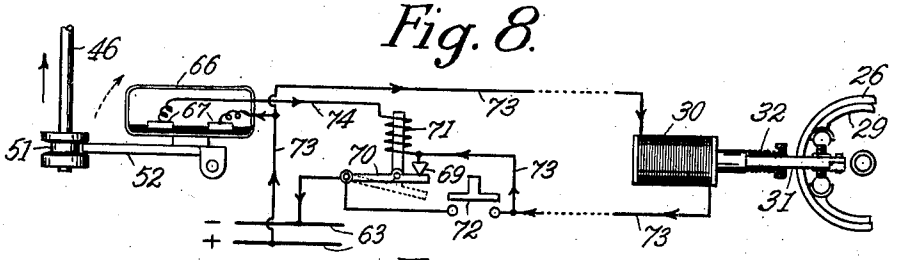


Fig. 9.

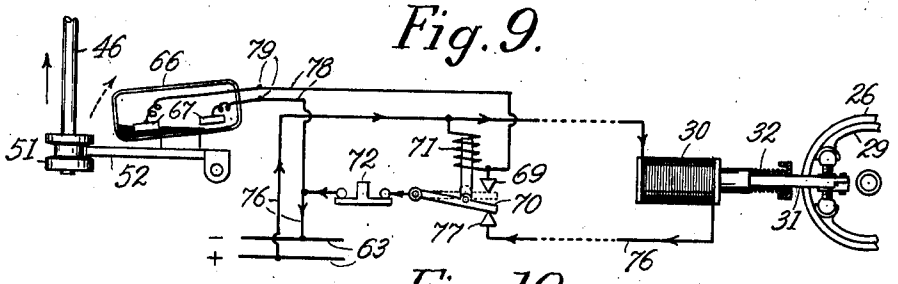
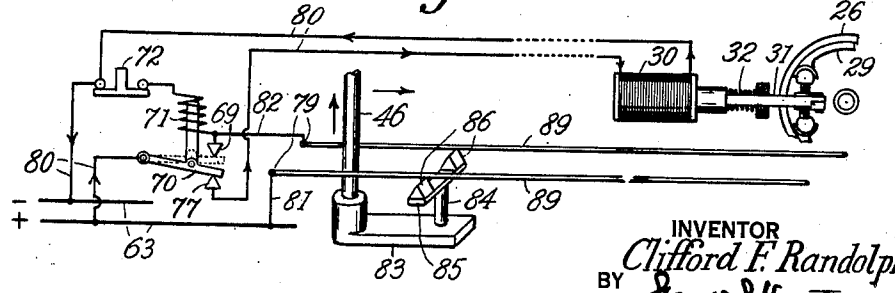


Fig. 10.



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Patented June 1, 1943 2,320,393

UNITED STATES PATENT OFFICE

2,320,393

LEAF CUTTER FOR CIGAR MACHINES

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Application February 17, 1940, Serial No. 319,371

28 Claims. (Cl. 131—21)

This invention relates to mechanism intended to be employed primarily in the fabrication of cigars, especially to such mechanism when utilized for the formation of wrapping elements from tobacco leaves used to envelope charges of filler tobacco, cigar bunches and like cigar components, and the invention relates more particularly to the provision of a device designed to afford increased safety to operatives employed in the hand service of cigar-fabricating mechanism used in cutting and shaping binders and wrappers, such mechanism for example as the suctional die heads and co-operating rollers carried by cutter heads movable over the dies in a manner familiar to those skilled in the manufacture and operation of machines for the fabrication of cigars.

In modern machines, the cutter rollers are arranged to move across the binder and wrapper cutting dies at given moments in the cycle of the machine, and the operatives are supposed to have finished laying their leaves on the dies before these cutting moments occur. If the operative is delayed for some reason, injury to her hands may take place unless the motion of the cutter arm, or preferably that of the entire machine is stopped, the last named arrangement having the advantage of avoiding the crippling of bunches in preparation at other parts of the machine.

In a safety device for this purpose, heretofore provided to avoid such injuries, and disclosed in U. S. Patent 1,984,813, granted December 18, 1934, to W. H. Schussler, a guard arm is resiliently attached to the cutter arm in advance of the cutter rollers, this arm, when striking an obstruction, causing the engagement of a pivoted member which releases the main clutch of the machine, thereby stopping the latter. The guard arm in this case starts a train of mechanical motions which accomplish the desired result, but naturally require a certain amount of time and energy, thus making for a more or less sluggish action.

Under such conditions, it is an object of the present invention to provide a more sensitive and a more rapidly operating safety device, and accordingly the invention consists in part of the provision of inter-connected guard plates which are pivoted across the front and rear of the cutter arm in such a manner that a gentle touch of an obstruction by either of these guard plates turns a lever, which, through a vertical plunger rod and a tiltable bar or other suitable means running along the path of the cutter arm, actuates a sensitive electrical control switch and thereby de-energizes a solenoid which normally holds the main clutch of the machine in engagement. The action of the safety clutch and that of the solenoid being instantaneous, this arrangement stops the machine immediately whenever one of the guard plates comes into contact with an object in its path, such as the arm or any other member of the operative's body.

The switch used with this safety device may desirably be a normally closed micro-switch of known type, with manual reset, so that the clutch solenoid remains de-energized and the machine at rest until the switch is reset by the operator. Or, as a desirable modification, the connections may be arranged for use with a normally closed or normally open mercury switch, or with normally open contact rails running along the path of the cutter arm.

When employing a mercury switch or contact rails, a reset button and a relay are desirably connected in the circuit, in order to keep the machine at rest until the obstruction which stopped it has been removed. Accordingly, the connections may be so arranged that the machine cannot run as long as the obstruction remains, even though the reset button is pressed; or so that the machine runs when the reset button is pressed, regardless of obstruction, but stops again when the reset button is released, as long as the obstruction remains. Other objects and features of the invention will appear as the description of the particular physical embodiments selected for the instant disclosure of the invention proceeds.

In the accompanying drawings:

Fig. 1 is an end elevation of part of a cigar machine leaf-cutter equipped with my improved safety device, in which use is made of an electrical control circuit, including a micro-switch;

Fig. 2 is a side elevation of the same, viewed from line 2—2 of Fig. 1;

Fig. 3 is a fragmentary detail view in end elevation, showing a modification in which use is made of a normally closed mercury switch;

Fig. 4 is a similar end elevation showing another modification in which use is made of a normally open mercury switch;

Fig. 5 is a fragmentary detail view in end elevation of a modification in which use is made of contact rails;

Fig. 6 is a diagram of the electrical connections in a control circuit employing a normally closed micro-switch with a manual reset;

Fig. 7 is a diagram of connections for an elec-

trical control circuit employing a normally closed mercury switch, providing for continued stoppage of the machine until the obstruction is removed;

Fig. 8 is a similar diagram of a modified electrical control circuit including connections for use of a normally closed mercury switch, to provide for intermittent running of the machine as long as the obstruction remains;

Fig. 9 is a similar diagram of modified connections providing for a normally open mercury switch or contact rails, acting to maintain continued stoppage of the machine;

Fig. 10 is a like diagram of a modified electrical control circuit with connections for a normally open mercury switch or contact rails to provide for intermittent running of such a machine.

Referring to Figs. 1 and 2, the arm 11 which is attached to a slide 12, moved by an endless chain 13 in a track 14 in the frame of a known type of machine for making cigars, carries conventional cutting rollers 15 across a conventional form of die 16, it being understood that these parts may be varied as desired and found suitable. The chain 13 is fastened to arm 11 by pins 17 and is driven back and forth by means of gears 18 and 19 (Fig. 6), and a rack 20 pivoted to a cam lever 21 which has a roller 22 working in the track of a cam 23 on the main shaft 24 of the cigar machine, this constituting a suitable form of actuating mechanism in the illustrative embodiment of the invention now under description. The shaft 24 is driven by a chain 25 from the main clutch of the machine, one member 26 of which is continuously driven by a belt 27 from a motor 28, while the other member 29 is electrically controlled by a solenoid 30 which, when energized, pushes a plunger 31 against the pressure of a spring 32, thereby turning an arm 33 fast on a right-and-left hand screw 34, the latter, when so turned, expanding the member 29 of the clutch and putting it into actuative engagement with the member 26.

A bracket 35 attached, at the rear of the rollers 15, to arm 11, carries a horizontal shaft 36 on which are fast a guard plate 37, a horizontal forked arm 38 and an upright arm 39. A lug 40, forward of the rollers 15, carries a horizontal shaft 41 on which are fast a guard plate 42 and downwardly extending arm 43. The free ends of arms 39 and 43 are connected pivotally by a rod 44. The forked arm 38 supports a collar 45 fast on vertical shaft 46, the latter being slidable in bearings 47 and 48 on arm 11 and the arm 38 in its normal position resting on bearing 47. The shaft 46 is held in its lower position on arm 38 by a spring 49 bearing against the lower face of bearing 47 and against a collar 50 on the shaft. To the lower end of shaft 46 is affixed a flanged collar 51 which remains in its lowest position shown, as long as the forked arm 38 rests on the bearing 47. But, when either of the guard plates 37 or 42 is turned by meeting an obstruction, the arm 38 rises from its rest position on bearing 47 and, by raising the stop collar 45, lifts the flanged collar 51 against the pressure of spring 49.

The lower flange of collar 51 (see Fig. 2), engages the free edge of a long bar 52 extending along the entire path of the collar 51, as the shaft 46 is moved bodily by travel of the cutter arm 11. This bar 52 is pivoted at its ends in brackets 53 and normally rests in horizontal position on a stop 54. At one end, the bar 52 carries a plunger 55 held in its up-position by a spring 56. Above the plunger 55 is located the operating pin 57 of a micro-switch 58 supported on the base of the machine by a bracket 59.

In its normal position, Fig. 6, the micro-switch 58 is held by a spring 60 tilted down against a contact 61, thereby closing an electrical control circuit 62 which is traced from the line 63 through the solenoid 30, this circuit passing through a number of hand-and-foot-control switches (not shown) and through other conventional or otherwise suitable control devices for manipulating the machine. By "micro-switch" is meant a snap action or toggle switch which requires movements of only a few thousandths of an inch to operate. A switch of this general class is disclosed in U. S. Patent No. 1,960,020. When the shaft 46 is raised by the impingement of an obstruction against one of the guard plates 37 or 42 (see Figs. 1 and 2), the bar 52 is tilted upwards, causing the plunger 55 to raise the pin 57 and thereby to open switch 58 (see dotted line position in Fig. 6). Thus, the current in control circuit 62 is interrupted and the solenoid 30 is de-energized, thereby allowing the spring 32 to open the clutch, whereby the actuating mechanism is incapacitated by stoppage of the machine. Upon removing the obstruction, the current in circuit 62 may be re-established at will by depressing the reset button 64 of the micro-switch, whereupon the solenoid 30 will re-engage the clutch and start the machine.

In Fig. 3, the tilting bar 52 by means of a clamp 65, carries a normally closed mercury switch 66 of known type, which, in its normal position, Fig. 7, causes the mercury level to connect contacts 67, and closes a circuit 68 from the line 63 through solenoid 30, returning through contact point 69 and lever 70 which are held closed by the relay coil 71 connected in parallel with solenoid 30. When the switch is tilted, as in Fig. 9, the connection between the contacts 67 is broken and the current in line 68 is interrupted, hence the solenoid 30 is de-energized, opening the clutch 29—26 and causing the machine to stop. On clearing the obstruction, the switch 66 returns to normal position, (as in Figs. 7, 8), closing the contact 67, but since the relay lever 70 is still open (see dotted lines), no current will flow in line 68 until the reset button 72 is momentarily depressed, thereby closing the circuit through coil 71. This will pull up switch 70 and re-establish the original circuit through wires 68, so that, on release of button 72, the solenoid 30 remains energized and the machine will continue to run.

With the connections shown in Fig. 8, the machine can be intermittently run before the obstruction is removed, that is, while the switch 66 is still in tilted position. In the untilted position, current flows from the line 63 through wire 73 to solenoid 30 and back through wires 73, contact 69, switch 70 and wire 73, the lever 70 being held closed by coil 71 which is energized by a shunt current from positive wire 73 through switch contacts 67 and wire 74, returning through contact 69 and lever 70 to negative wire 63. When the switch 66 is tilted from its Fig. 8 position the current through coil 71 is broken and the relay lever 70 drops, breaking the current through solenoid 30. On depressing the reset button 72, the current through solenoid 30 is re-established, thereby starting the machine, but on releasing button 72, the current in solenoid 30 is again broken and the relay drops out, again stopping the machine which will only run as long as the button 72 is

depressed. However, on removing the obstruction, the switch 66 will return to its normal position and the contacts 67 will close. When the button 72 is then depressed, the relay will pull in and stay in after releasing the button, since now the current through coil 71 is maintained by the shunt circuit through contacts 67.

In Fig. 4, the mercury switch 66 is mounted on the bar 52 in a tilted position by means of an inclined clamp 75. The switch therefore is normally open as shown in Fig. 9, the contacts 67 being disconnected. In this position, the current from the line 63 flows through solenoid 30 by way of wires 76, contact 77, open relay lever 70, normally closed reset button 72, and return wire 76. On up-tilting the bar 52, the switch 66 becomes level and the contacts 67 are closed. Current then will flow through wires 79 to relay coil 71, thus raising lever 70 and thereby opening contact 77 and closing contact 69. The relay lever 70 will stay up against contact 69 as long as the contacts 67 remain closed, no matter whether reset button 72 is depressed or not, hence the machine will stop until the switch 66 is tilted into normal position, that is to say, until the obstruction is removed. However, if the connections are made as in Fig. 10, in which the mercury switch 66 is then placed across the points 79 instead of the device shown, the current will normally flow from line 63 through wires 80 and contact 77 to solenoid 30. On connecting the points 79 by closing the switch 66 on meeting an obstruction, current will then flow through wire 81, switch 66, wire 82, coil 71 and closed reset button 72, thereby raising relay lever 70 and breaking the circuit through solenoid 30. By depressing the reset button 72, the current through coil 71 is broken, causing the relay lever 70 to drop onto contact 77, thus restoring the circuit through solenoid 30. In this case, therefore, the machine will run as long as the reset button is depressed, even when the obstruction remains.

In Fig. 5, another arrangement for transmitting the encounter of an obstruction to the electric operating circuit of the machine is shown. Here, the flanged collar 51 at the lower end of shaft 46 is replaced by a horizontal arm 83 which carries a vertical plunger 84 on which is mounted a metallic cross bar 85 carrying two contacts 86. The cross bar 85 is slidable on guide rods 87 in arm 83 and is held in its top position on plunger 84 by a spring 88. Instead of the tiltable bar 52, the path of the cutter arm is provided with two contact rails 89 attached in registration with the contacts 86 to insulating blocks 90 supported on the base of the machine by cleats 91. To prevent turning of shaft 46, the lower shaft bearing 92 in this case is provided with a vertical guide pin 93 fitting into a hole or slot in a collar 94 fixedly attached to said shaft. The insulated contact rails 89 being electrically equivalent to an open switch, the connections may be made either as shown in Fig. 9 or in Fig. 10, the contact rails taking the place in Fig. 9 of switch contacts 67. When connections are made as in Fig. 9, the machine, after being stopped by an obstruction, cannot be started again until the obstruction is removed; but when connections are made as in Fig. 10, the machine will run before clearing the obstruction as long as the reset button 72 is held in depressed position (not shown in Fig. 10.

The invention above described may be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many concrete embodiments of the same. The invention therefore is not to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. The combination with a cutting bed, of movable means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said control circuit to incapacitate said drive.

2. The combination with a cutting bed, of movable means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said contral circuit to incapacitate said drive, said mechanism including at least one sensing device adapted to be contacted physically by said obstruction, an operator member for completing or breaking said control circuit, and connections by which operation of a sensing device acts to move said operator member to make said control circuit effective.

3. In a machine of the class described, having a cutting die, a cutter head movable over said die, actuating mechanism for said head, means to incapacitate said actuating mechanism including an electrical control circuit comprising an electrical switch, and a switch-controlling device movable with said cutter head, being constructed and arranged to operate said switch and thereby make said control circuit effective to incapacitate said actuating mechanism immediately upon physical contact by said device with an obstruction in the path of said cutter head.

4. The combination with a cutting bed, of means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said control circuit to incapacitate said drive, said mechanim comprising a device movable with said cutting means, a co-operating device extending along the path of said movable device, an electrical switch device in said control circuit and connections between said devices whereby said physical contact with an obstruction operates said switch for incapacitation of said driving means.

5. A control mechanism for a machine of the class described, having the features claimed in claim 4, wherein provision is made of a clutch for said driving means and a solenoid for control of said clutch, said solenoid being included in said control circuit and operated by said switch.

6. A control mechanism for a machine of the class described, having the features claimed in claim 4, wherein provision is made of a clutch for said driving means and a solenoid for control of said clutch, said solenoid being included in said control circuit and operated by said switch, to release said clutch when made effective by said control circuit, being normally operative to hold said clutch in engagement to drive the machine.

7. Mechanism for incapacitating the driving means of a machine of the class described having the features claimed in claim 1, wherein provision is made of a pair of guard plates each operating for engagement with such an obstruction by said cutting means when moving in one direction in its path, an electric control switch included in said circuit, and direct-acting connec-

tions whereby sensitive response of said switch is made effective to incapacitate said driving means instantaneously upon occurrence of such physical contact.

8. Mechanism for incapacitating the driving means of a machine of the class described having the features claimed in claim 1, wherein provision is made of a guard plate movable with said cutting means and operating for engagement with such an obstruction, a switch device included in said control circuit, a switch operating means extending parallel with the path of travel of said guard plate, and connections constructed and arranged for actuation by said plate, and disposed at all times in position to actuate said switch.

9. The combination with a cutting bed, of movable means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said control circuit to incapacitate said drive, said driving means including a clutch and said control circuit including a solenoid which normally holds said clutch in its driving position, and an electric switch in said control circuit normally set to maintain a circuit condition adapted to energize said solenoid and operable by action of said mechanism to de-energize said solenoid and thereby disengage said clutch to stop said machine.

10. The combination with a cutting bed, of movable means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit including a switch for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said control circuit to incapacitate said drive, said mechanism being further characterized by a manually operable means for resetting said switch, and said switch being of the normally closed type and so disposed as to be held open until reset after actuation by operation of said incapacitating mechanism.

11. The combination with a cutting bed, of movable means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit including a switch for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said control circuit to incapacitate said drive, said mechanism being further characterized by a manually operable means for resetting said switch, and said switch being of the normally open type, a relay in said circuit and adapted to keep the machine at rest until removal of said obstruction, and connections so disposed as to incapacitate the machine as long as the obstruction remains, even though said reset means be operated.

12. The combination with a cutting bed, of movable means for cutting a leaf section on said bed, including driving means therefor, and an electrical control circuit including a switch for incapacitating said driving means, and mechanism operated by physical contact with an obstruction in the path of said cutting means, and co-acting with said control circuit to incapacitate said drive, said mechanism being further characterized by a manually operable means for resetting said circuit to capacitate said drive, and said switch being of the normally open type, a relay in said circuit and adapted to keep the machine at rest until removal of said obstruction, and connections so disposed as to rehabilitate said machine whenever said reset means is operated regardless of said obstruction, and to stop the machine whenever said reset means is released, as long as the obstruction remains.

13. In a machine of the class described, having a cutting die, a cutter head movable over said die, actuating mechanism for said head, and means to incapacitate said actuating mechanism comprising an electrical control circuit including an electrical switch; operating means for said switch comprising a switch operator member traveling with said cutter head and adapted to be moved by physical contact with an obstruction in the path of said cutting head to operate said switch thereby making said control circuit effective to incapacitate said driving mechanism, said member being in switch-operating relation at every point in said path.

14. A machine of the class described, having the features claimed in claim 13, in which provision is made of a track mounted on a stationary part of said machine, and an actuating member carried by said cutter head in position to travel along said track, being constructed and arranged to co-operate with said track to operate said switch at every point in the travel of said cutting head along said path.

15. A machine of the class described, having the features claimed in claim 13, in which provision is made of a movable track mounted on a stationary part of said machine, and an actuating member carried by said cutter head in position to travel along said track, being constructed and arranged to co-operate with said track at every point in the travel of said actuating member along said track, connections between said switch and track and between said first-named operator member and said actuating member; whereby upon movement of said first-named operator member at any point in the path of said cutter head by an obstruction in said path, said track is moved to actuate said switch.

16. In a cigar machine, the combination with a stationary support, of a tobacco leaf cutting bed mounted on said support, cutter means movably mounted on said support for travel over said bed in a predetermined path to cut a leaf section on the bed, driving means for said cutter means, an electrical control circuit arranged to incapacitate said driving means, and circuit making and breaking means having coacting parts on said cutter means and said support for causing said circuit to incapacitate said driving means when said cutter means meets an obstruction in its path.

17. In a cigar machine, the combination with a stationary support, of a tobacco leaf cutting bed mounted on said support, cutter means movably mounted on said support for travel over said bed in a predetermined path to cut a leaf section on the bed, driving means for said cutter means, an electrical control circuit arranged to incapacitate said driving means, and circuit making and breaking means having coacting parts on said cutter means and said support for causing said circuit to incapacitate said driving means when said cutter means meets an obstruction in its path, one of said parts being elongated and extending in the same direction as the path of travel of said cutter means to remain in operative

relationship with the other of said parts despite the travel of said cutter means.

18. In a cigar machine, the combination with a stationary support, of a tobacco leaf cutting bed mounted on said support, cutter means movably mounted on said support for travel over said bed in a predetermined path to cut a leaf section on the bed, driving means for said cutter means, an electrical control circuit arranged to incapacitate said driving means, and circuit making and breaking means having coacting parts on said cutter means and said support for causing said circuit to incapacitate said driving means when said cutter means meets an obstruction in its path, one of said parts including a rail and the other of said parts including a rail follower so constructed and arranged that one may operate the other at substantially any point along the path of travel of the cutter means.

19. In a cigar machine, a cutting die, a tobacco leaf cutting device traveling over said die, guard means connected to said cutting device, a circuit completing and breaking means for incapacitating the cigar machine, means for interconnecting said cutting device with said circuit completing and breaking means to actuate the latter when the guard means comes in contact with an obstruction.

20. In a cigar machine, a stationary support, a tobacco leaf cutting bed mounted on said support, cutter means movably mounted on said support for travel over said bed in a predetermined path to cut a leaf section on the bed, driving means for said cutting means, a plurality of guard means mounted in front of and in the rear of said cutting means, a circuit completing and breaking means to incapacitate said driving means, and means interconnecting said guard means with said circuit completing and breaking means to actuate the last named means when the guard means comes in contact with an obstruction.

21. In a cigar machine, a cutting die, a tobacco leaf cutting device traveling in a substantially straight path over said cutting die, guard means mounted on at least one side of said cutting device, a circuit completing and breaking means secured to a substantially stationary part of the cigar machine for incapacitating the cigar machine, means connected to the guard means for actuating said circuit completing and breaking means when the guard plate comes in contact with an obstruction in the path of its travel to incapacitate the cigar machine.

22. In a cigar machine, a cutting die, a potentially dangerous member traveling over said die, safety guard means connected to and traveling with said member and adapated to be actuated by an obstruction in the path of travel of said member, and an electrical control circuit including a Micro switch for incapacitating the cigar machine when actuated by said safety guard means.

23. In a cigar machine, a cutting die, a potentially dangerous member traveling over said die, safety guard means connected to and traveling with said member and adapted to be actuated by an obstruction in the path of travel of said member, and an electrical control circuit including a Mercury switch for incapacitating the cigar machine when actuated by said safety guard means.

24. In a cigar machine, a cutting die, a potentially dangerous member traveling over said die, sensitive guard means connected to and traveling with said member and adapted to be actuated by an obstruction in the path of travel of said member, sensitive means for completing and breaking an electrical circuit, said sensitive means being actuated by said guard for incapacitating the cigar machine when the guard means comes in contact with an obstruction in its path of travel.

25. In a cigar machine, a cutting die, a potentially dangerous member traveling over said die, safety guard means connected to and traveling with said member adapted to be actuated by an obstruction in the path of travel of said member, a substantially stationary electrical control device for completing and breaking an electrical circuit positioned to be actuated by said guard means, and mechanism operated by said circuit for actuating a clutch member to incapacitate the cigar machine.

26. In a cigar machine, a cutting die, a potentially dangerous member traveling over said die, safety guard means connected to and traveling with said member adapted to be actuated by an obstruction in the path of travel of said member, a substantially stationary electrical control device positioned to be actuated by said guard means, mechanism operated by said control device for incapacitating and maintaining in an incapacitated state the cigar machine when the guard means comes in contact with an obstruction.

27. In a cigar machine, a cutting die, a potentially dangerous member traveling over said die, safety guard means connected to and traveling with said member adapted to be actuated by an obstruction in the path of travel of said member, a substantially stationary electrical control device positioned to be actuated by said guard means, mechanism operated by said control device for incapacitating the cigar machine, and means for maintaining said machine in an incapacitated state until manually restarted by the operator.

28. A machine having a cutting die, a cutter head movable over said die, actuating mechanism for said cutter head, and means to incapacitate said actuating mechanism comprising an electric control circuit including electric conductors adapted to be bridged, a bridging member for serving as a contact maker and breaker in cooperation with said electric conductors, an operator member traveling with said cutter head and adapted to be moved by physical contact with an obstruction in the path of said cutting head, connections between said operator member and said bridging member whereby operation of said operator member by physical contact with an obstruction at any point in the path of said cutter head is translated into movement of said bridging member to make said control effective to incapacitate said driving mechanism.

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