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SAFETY DEVICE FOR CIGAR MACHINES

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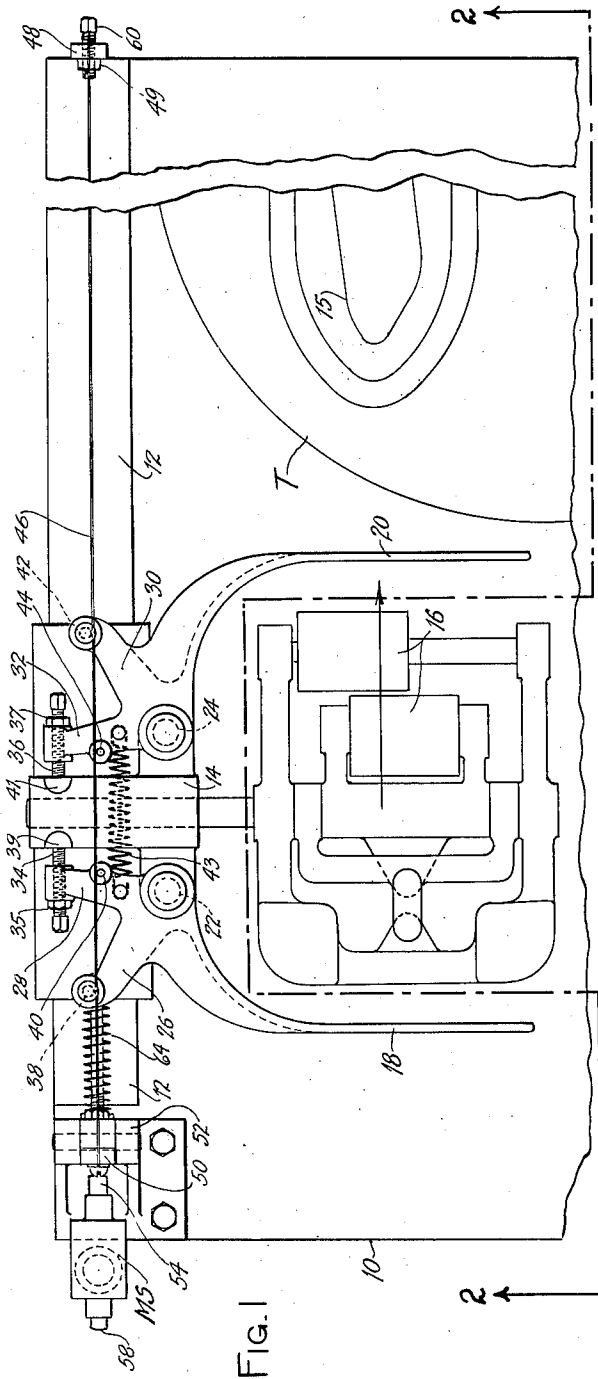


FIG. 1

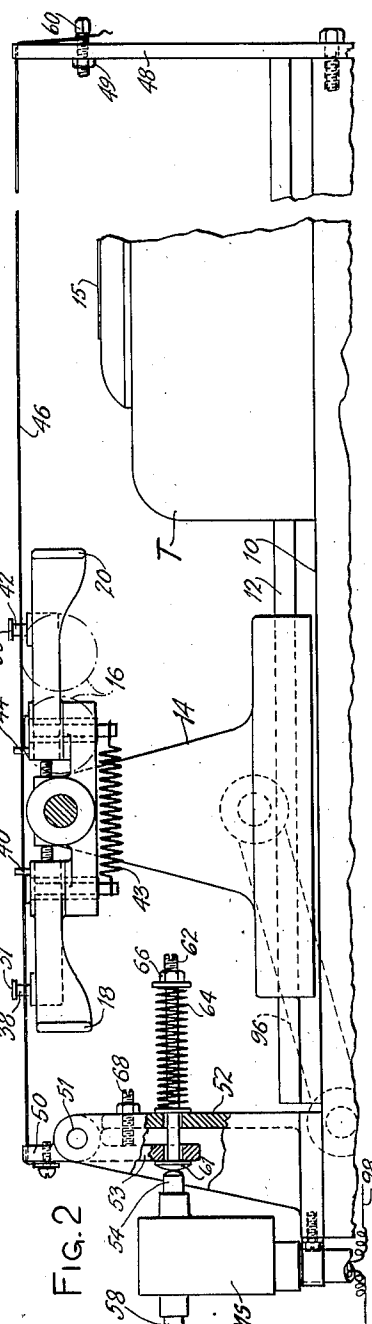


FIG. 2

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SAFETY DEVICE FOR CIGAR MACHINES

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15 Claims. (Cl. 131—21)

This invention relates to an improved safety device for use with potentially dangerous transfer members such as the cutting rollers traveling over the binder and wrapper dies of a cigar machine.

In a cigar machine, the cutting rollers are arranged to move across a binder or wrapper cutting die at given moments in the cycle of the machine. Should an operator for some reason have her hands in the path of the cutting rollers, there is danger that she may be injured by the advancing rollers. There is also the possibility that an operator might instinctively place her hands beyond the cutting rollers into the machine to rectify some improper functioning thereof, thus exposing herself to injury from the moving parts of the machine.

The safety devices heretofore provided were either of such a nature as to be expensive to install, such as a photoelectric unit, or were entirely mechanical in operation so as to render a greater amount of resistance necessary before the same would operate to bring the dangerous moving element to a stop.

The present invention is an improvement over the device shown in my copending application, Serial No. 319,371, filed February 17, 1940, in that the structure is much simpler and therefore less expensive to install. Moreover, there is the additional feature that the operator is not only protected from injury by the cutting rollers but also from injury from mechanism located in back of the cutting rollers.

It is therefore an object of my invention to provide a safety device which will be simple in structure, inexpensive to install, and as sensitive as those heretofore employed.

Another object is to provide a safety device which will not only protect an operator from injury by the cutting rollers but also from injury where the operator has placed her hands beyond the immediate sphere of operation of the cutting rollers.

A further object is to provide a safety device which will not require regular replacement such as the tube or bulb of a photoelectric unit.

Another object is to provide a safety device which can be used with a wide variety of machines which have potentially dangerous parts and which will render these parts harmless whenever a foreign member actuates the safety device.

A further object is to provide an automatic safety device which will maintain a machine in an incapacitated state until restarted manually by the operator.

It is also an object to provide an improved and

simplified safety device which will stop the entire machine whenever the safety device is actuated by an obstruction which might cause injury or damage.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses.

In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings, in which:

Fig. 1 is a plan view showing my device as applied to the wrapper cutter rollers of a cigar machine;

Fig. 2 is a side elevational view taken on line 2—2 of Fig. 1 with the cutting roller mechanism omitted; and

Fig. 3 is an elevational view showing the drive mechanism for the wrapper cutter and the wiring from the micro switch to the magnetic clutch.

Referring to the accompanying drawings, which illustrate a preferred embodiment of my invention, reference number 10 designates the table top of a cigar machine; and 12 is a track guide for the wrapper cutter carrier 14, in which are mounted the cutter rollers 16. A turret T carries the knives 15 on which the wrapper leaf is cut by the rollers 16, as they pass over the leaf.

My device functions to prevent an accident should the operator inadvertently get in the way of the advancing cutter carrier 14 and rollers 16.

Two arms 18 and 20 are pivotally mounted on pins 22 and 24 respectively in cutter carrier 14. Each arm 18 and 20 has two branch arms 26, 28 and 30, 32 respectively. These branches are each provided with a pin so located that when adjusted by set screws 34 and 36, pins 38, 40, 42 and 44 will just clear a wire 46 which is strung parallel to the path of travel of the cutter carrier 14. After the set screws 34 and 36 have been adjusted so that the pins 38, 40, 42 and 44 just clear the wire 46, they are held in said position by lock nuts 35 and 37. Heads 31 and 33 are provided on the upper portions of pins 38 and 42 to prevent the wire 46 from jumping off said pins when being deflected thereby. The set screws 34 and 36 act against abutments 39 and 41 formed on the cutter carrier 14 and are held against said abutments by means of tension spring 43 drawing the branch arms 28 and 32 toward each other.

It will thus be seen (Fig. 1) that a slight motion of arms 18 or 20, in the direction of the cutter rollers 16, will cause the pins 38 and 40

or pins 42 and 44, as the case may be, to impinge on the wire 46 and produce a local distortion in the wire, thereby shortening the outstretched length of the wire. This shortening will cause the wire to operate a micro switch hereinafter described.

One end of the wire 46 is anchored to a stationary bracket 48 and the other end is attached to a lever arm 50 of lever 50, 53. The lever arm 50 is pivoted on a pin 51 in a bracket 52 which is secured to the table top 10.

The shortening of the wire 46, as before described, will produce a movement of lever arm 50. An opposite arm 53 of said lever will then move against the button 54 of a micro switch MS, which is normally held open, to close the same; and the circuit leading to a magnetic clutch MC will energize the same to disengage the clutch, causing the machine to stop. The micro switch MS is of conventional snap action construction well understood by those skilled in the art, and for further construction details reference may be made to such patents as Mottlau 1,668,974 and McGill 1,960,020. The diagrammatic clutch shown herein may be of conventional construction or may be similar to that shown and described in H. H. Wheeler's copending application Ser. No. 183,405, filed Jan. 5, 1938, and is of such construction that when the ring 99 expands due to the energizing of the solenoid, it causes the clutch to engage; and when the ring 99 is contracted due to the de-energizing of the solenoid, it causes the clutch to disengage to bring the machine to a stop.

This stoppage may be brought about by the operator accidentally coming in contact with either of the arms 18 and 20; or by coming in direct contact with the taut wire 46. Due protection is afforded the operator in this manner in that should she inadvertently have placed her hands in the path of the cutting rollers 16 during their forward travel or during their return travel, her contact with arms 18 or 20 would bring the machine to a halt before injury could be sustained. Should the operator have placed her hands to the rear of the cutting rollers perhaps to remedy the improper application of the cigar wrapper by the wrapper applying mechanism to a cigar bunch, she will in all likelihood touch the wire 46 and this will serve to bring the machine to an automatic stop before she sustains any injury. Any foreign obstruction in the path of the cutting rollers either during their forward or their return travel will also bring the machine to a stop before any damage can be done, in a manner similar to that just described.

The present invention is so constructed that once the machine has been automatically stopped in the manner above described, it has to be manually restarted by the operator and will not automatically commence functioning again after the obstruction has been removed. This restarting is accomplished by the operator pushing the reset button 58 of the micro switch MS, which will cause the magnetic clutch MC to be de-energized to cause the clutch to re-engage the driving mechanism. A bolt 62 passing through suitable openings formed in the arm 53 and in the bracket 52 serves to hold the wire 46 under proper tension. It will be seen in the drawings that the head end 61 of said bolt rests against the outside portion of lever arm 53 and tensions said lever arm by means of a spring 64 pushing against the bracket 52 and the ad-

justing nut 66. The adjusting nut 66 is so set that the head end 61 of the bolt 62 is in close contact with the button 54 of the micro switch MS so that a slight movement of said head 61 will cause the micro switch MS to operate. A second adjustment of wire 46 is provided in the form of a bolt 60 acting in a manner similar to a key winding up a violin string. Once this adjusting device 60 has been properly set, it is locked in fixed position by the lock nut 49.

The drive of the cutter operating mechanism, as shown in Fig. 3, is derived from the main drive of the cigar machine.

A belt pulley 70 attached to the shaft 72 of a motor M' is connected by a belt 74 to a pulley 76 on a shaft 78. A worm 80 on shaft 78 meshes with a worm wheel 82 secured on a shaft 84. Also attached to shaft 84 is a cam drum 86.

A cam roller 88, mounted on one end of a cam lever 90, engages a cam groove 85 in drum 86. Cam lever 90 is fixedly secured to a shaft 92 and imparts operating motion thereto. A lever 94 is also fixedly secured to shaft 92 to receive operating motion therefrom. The outer end of lever 94 is connected by a link 96 to the wrapper cutter carrier 14, which is mounted for slidable movement on track 12.

When the motor M is started and the micro switch MS is in "circuit open" position, the various mechanical parts just described will function, in progressive order, first to advance the carrier 14 with the cutting rollers 16 over the turret T to cut a wrapper leaf placed thereon by an operator, and then to retract the cutter carrier 14.

When the foregoing action is taking place, the operator is protected against injury from the cutting rollers by the guard arms 18 and 20 which will cause the machine to stop if they engage any object during their travel. If an object were encountered in the path of arms 18 or 20, it would cause the micro switch MS to snap shut, as already described, and with the circuit 98 closed, the magnet in the magnetic clutch MC would be energized, thereby releasing the clutch and causing the cutter to cease operation.

Although the construction and operation of the magnetic clutch MC is similar to one used and described in H. H. Wheeler's co-pending application, Serial No. 183,405, filed January 5, 1938, any other suitable electrically operated clutch might be used in place thereof.

Although in the present disclosure it is preferable to stop the entire machine when an obstruction actuates the levers 26 or 30 to impinge wire 46, it may be desirable when this device is used with other machines to only stop the operation of the dangerous member and not the entire machine. Such a modification is intended of course to come within the scope of the subjoined claims.

Although this safety device has been shown connected to a cigar machine, it could also be used with other machines having dangerous parts to protect an operator from injury therefrom.

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. In a cigar machine, a cutting die; a tobacco leaf cutting device passing over said die; a taut wire strung parallel to the path of travel of said cutting device; guard arms pivotally mounted on said cutting device; means associated with said guard arms normally avoiding contact with said wire, so constructed and arranged as to impinge said wire when actuated by said guard arms and thereby shorten the outstretched length of said wire; and a circuit completing and breaking means associated with said wire for incapacitating the cigar machine when the outstretched length of said wire is shortened by said impinging means.
2. In a cigar machine, a traveling potentially dangerous member; an outstretched wire running substantially parallel to the path of travel of said potentially dangerous member; guard means connected to and traveling with said potentially dangerous member, said guard means being constructed and arranged to engage with said wire when an obstruction in the path of travel of said member encounters said guard means; and means actuated by said wire for bringing the traveling movement of said member to a halt.
3. In a cigar machine, a traveling potentially dangerous member, an outstretched wire running substantially parallel to the path of travel of said potentially dangerous member, guard elements pivotally mounted on said member and positioned to engage with any foreign obstruction in the path of travel of said member; distorting means connected to said elements and adapted to normally clear said wire and to distort the same when said elements engage with an obstruction in the path of travel of said potentially dangerous member, and means actuated by the distortion of said wire for stopping the travel of said potentially dangerous member.
4. In a cigar machine, a die, a device having cutting rollers traveling over said die, a thin flexible element stretched adjacent to said device, guard mechanism connected to said device and positioned to engage with any foreign obstruction in the path of travel of said device, means associated with said guard mechanism for shortening the outstretched length of said thin flexible element when said guard mechanism engages with a foreign obstruction in its path of travel, and means actuated by said shortening to bring said cutting rollers to a halt.
5. A safety device comprising, a taut outstretched wire, machine stopping mechanism associated with one end of said wire adapted and arranged to stop said machine when said wire is actuated, a potentially dangerous member moving toward and away from a predetermined position and operating in the vicinity of said wire, and operating means connected to said member and movable toward and away from said predetermined position with said member and adapted to engage with and actuate said wire when an obstruction is encountered by said operating means while the latter is moving either toward or away from said predetermined position.
6. In a cigar machine, a safety device comprising, a table, a dangerous member operating over said table, a taut outstretched wire positioned adjacent to the path of travel of said dangerous member, means positioned at one end of said wire and adapted to be actuated by the shortening of the outstretched length of said wire to bring the operation of said dangerous member to a stop, means associated with said dangerous operating member positioned to actuate said wire when said operating means engages an obstruction in the path of travel of said member.
7. In a cigar machine, a safety device comprising, a taut outstretched wire, machine stopping mechanism associated with one end of said wire adapted and arranged to stop said machine when said wire is actuated, a potentially dangerous member operating in the vicinity of said wire, operating means connected to said member and adapted to engage with and actuate said wire when an obstruction is encountered by said operating means, and means for maintaining the operation of said dangerous member in an incapacitated state until restarted under the volitional control of the operator of the machine.
8. In a cigar machine, a safety device comprising, a traveling potentially dangerous member, a wire stretched adjacent the path of travel of said member, guard elements mounted in front of and in rear of said member adapted and arranged to engage with said wire when one of said guard arms engages with an obstruction in the path of travel of said dangerous member, and electric circuit completing and breaking mechanism associated with said wire for rendering the driving mechanism of said dangerous member inoperative when said wire is actuated by said guard arms.
9. In a cigar machine, a safety device comprising, a traveling potentially dangerous member; a wire stretched adjacent the path of travel of said member; guard elements mounted in front of and in rear of said member adapted and arranged to engage with said wire when one of said guard arms engages with an obstruction in the path of travel of said dangerous member; and electric circuit completing and breaking mechanism associated with said wire for rendering the driving mechanism of said dangerous member inoperative when said wire is actuated by said guard arms, said electric circuit completing and breaking mechanism being constructed and arranged to maintain the driving mechanism in an inoperative condition when once stopped until restarted by the operator.
10. A safety device comprising, an outstretched wire; a guard lever connected to a potentially dangerous member for travel therewith, said lever being arranged to actuate said wire when an obstruction in the path of travel of said dangerous member engages with said guard lever; and circuit breaking and completing means associated with said wire for operating a magnetic clutch when said wire is actuated by said guard lever, said magnetic clutch being interposed in the driving mechanism operating said dangerous member for incapacitating the same.
11. A safety device suitable for such a machine as a cigar making machine having a table and a dangerous moving member operating over said table comprising, an outstretched wire, feeler elements traveling with said moving member positioned to engage with an obstruction in the path of travel of said moving member and adapted to actuate said wire as a result of said engagement, and an electric circuit completing and breaking device associated with said wire for actuating a clutch interposed in the mechanism operating said dangerous moving member, to stop the movement of the same.
12. In a cigar machine, a traveling potentially

dangerous member; a motor operating said machine and dangerous member; a magnetic clutch interposed in the drive connecting said motor to said machine; an outstretched wire stretched adjacent to the path of travel of said potentially dangerous member; pivoted guard arms connected to said potentially dangerous member, said arms being constructed and arranged to engage with said wire and shorten the outstretched length thereof when an obstruction is encountered in the path of travel of said dangerous member; a switch positioned at one end of said wire to be operated by the shortening of said wire; and an electrical circuit, connected to said magnetic clutch and to said switch, for actuating said magnetic clutch to stop the machine when the outstretched length of said wire is shortened.

13. A safety device for a machine comprising, a taut outstretched wire; a potentially dangerous member operating adjacent to said wire; a guard member for detecting foreign objects in the path of travel of said dangerous member, said guard being constructed and arranged to actuate said wire when an obstruction is detected; a circuit completing and breaking mechanism associated with one end of said wire for receiving operating movement from said wire each time said wire is actuated; and a machine stopping device interposed in an electrical circuit connected to said circuit completing and breaking mechanism for bringing the machine to a stop when said circuit completing and breaking mechanism is operated by said wire.

14. In a cigar machine having a potentially dangerous member and a drive for operating said machine and member; a safety device comprising, an outstretched wire stretched adjacent to

the path of travel of said potentially dangerous member; movable guard members mounted on said traveling potentially dangerous member, said guard members being constructed and arranged to shorten the outstretched length of said wire when an obstruction is encountered in the path of travel of said dangerous member; an electrically operated clutch interposed in said drive; an electrical circuit for operating said clutch to drive and stop said machine; circuit completing and breaking mechanism connected to said circuit and operated by the shortening of said wire to cause said clutch to engage to drive said machine and to cause said clutch to be disengaged to bring the machine to a stop when an obstruction is encountered in the path of travel of said dangerous member.

15. In a cigar machine having a traveling potentially dangerous member and a drive for operating said machine and member; a safety device comprising, an outstretched wire positioned adjacent to the path of travel of said potentially dangerous member, guard elements connected to said member for shortening the outstretched length of said wire when an obstruction is encountered in the path of travel of said dangerous member, an electrically controlled clutch maintained normally in engaged position interposed in said drive for incapacitating said machine when the outstretched length of said wire is shortened, an electrical switch positioned at one end of said outstretched wire and constructed and arranged to be actuated by the shortening of said outstretched wire, and an electrical circuit connecting said switch with said clutch mechanism.

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