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MEANS FOR DETECTING DEFECTS IN CIGARETTE ASSEMBLIES

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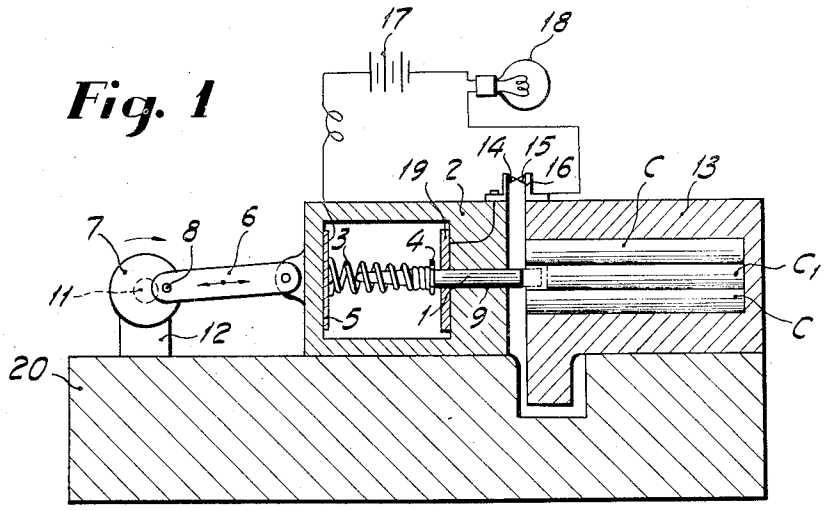
Fig. 1



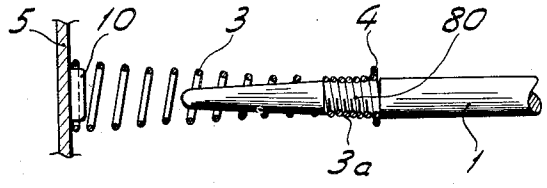


Fig. 2

Inventor
Lars E. Bergman
by Sommers & Young
Attorneys

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MEANS FOR DETECTING DEFECTS IN CIGARETTE ASSEMBLIES

Lars E. Bergman, Djursholm, Sweden, assignor to Arenco Aktiebolag, Stockholm, Sweden, a Swedish joint-stock company

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5 Claims. (Cl. 200—61.41)

This invention relates to means for detecting defects in assemblies of cigarettes to be wrapped in cigarette packaging machines and it is an object of the invention to provide improved means for such purpose by detecting defects in or lack of any cigarette in each assembly to actuate an electrically operable control device whereby an alarm, or assembly discarding or removing device will be operated.

Another object of the invention consists in the reduction of the inertia of certain movable feeler members of said detecting means whereby injury of the delicate cigarettes will be obviated.

Still another object of the invention consists in the provision of electrically conductive means for said purpose operating unaffected of uncontrolled electric resistances in sliding guide surfaces for said feeler members.

A further object of the invention consists in the utilization of feeler control springs as electric conductors to simplify the construction and reduce the costs of manufacture of the detecting apparatus.

With these and other objects not specifically mentioned, in view, the invention consists in certain constructions and combinations of parts which will be hereinafter fully described and set forth in the appended claims.

In the accompanying drawing:

Figure 1 is an elevational sectional view of an apparatus embodying the invention; and

Figure 2 is an enlarged view, partly in section, of a feeler member and its associated helical spring.

Referring to Figure 1 of the drawing, showing one feeler pin 1 only in the apparatus assumed to comprise twenty feeler pins and associated members, said pins, consisting of a light dielectric, that is electrically non-conductive material, for example plastic material, are slidably mounted in bores 9 in a box 2 consisting of dielectric material and forming part of a cigarette packaging machine. Each pin 1 is enclosed by a tapered helical compression spring 3 of steel or another metal. The smaller end 3*a* of the spring 3 is screwed on a threaded portion 80 of the pin 1 and it has an annular flange 4 consisting of one or several convolutions. At its butt end the spring 3 rests against a metal plate 5 which is secured to the inside of the rear wall of the box 2 and has a boss 10 projecting into said end of the spring.

The box 2 is mounted on a base plate 20 upon which it is displaceable in the longitudinal direction of the pins 1 and it is connected by a link 6 to an eccentric pin 8 on a disc 7 which is secured to a continuously rotating drive shaft 11 mounted in a bearing bracket 12 secured to the base plate 20.

Assemblies, for example open ended packages, containing in the assumed case twenty cigarettes, are introduced into metal pockets 13 in a conveyor advancing stepwise on the plate 20 to move said pockets successively transversely to the longitudinal directions of the pins 1 into a position right in front of the box 2 with the open ends exposed to the pins.

Secured to the inside of the front wall of the box 2 is a metal plate 19 which is electrically connected to a contact pin 14 positioned opposite to another contact pin 15 secured to a stationary metal contact rail 16 engaging the metal pockets 13 passing below same. The metal plate 5 and contact pin 15 are interconnected by an electric conductor including a source of current 17 and an incandescent lamp 18.

When the box 2 is in its rear position (to the left in Figure 1) the flanges 4 of all the springs 3 are in engagement with the metal plate 19 but the contact between the pins 14 and 15 is broken. When the box 2 with its feeler pins 1 is advanced, that is moved to the right in Figure 1, towards the pocket 13 the pins 1 will abut the ends of the oppositely disposed cigarettes C in the assembly or open ended cigarette package in said pocket. Thereby the pins 1 will be arrested so that the flanges 4 of the springs 3 are moved out of contact with the metal plate 19 whereby the circuit including the lamp 18 remains open when the pin 14 contacts the pin 15. But if any cigarette in the assembly, or package, is missing or is so soft that feeler pin 1 which is located right opposite to said defective cigarette, or to the gap where a cigarette is missing, will continue forwardly together with the box 2 so that the contact between the flange 4 and the metal plate 19 will remain closed. If the cigarette C_1 is too short, as indicated in a dash and dot line in Figure 1, it cannot arrest the oppositely disposed advancing pin 1 but the flange 4 will remain in contact with the plate 19 when the pins 14 and 15 abut each other. In such case the lamp 18 will be lighted to indicate that the package is defective and is to be removed from the correct packages. The lamp 18 may be replaced by another control device, for example a bell or an electrically operated device for removing the defective packages automatically.

For the purpose of reducing the stock of spare parts for rebuilding the apparatus to accommodate to variously sized packages it might be sufficient to change the distance between the pins as well as their relative positions by exchanging that portion of the box 2 which has the bores 9 whereby the center lines of the pins 1 and their associated springs 2 might be slightly off-set relative to each other.

I claim:

1. In detecting means for use in cigarette assembling and packaging apparatus, said detecting means comprising a pocket receiving an assembly of cigarettes, a pin carrier, a plurality of feeler pins slidably mounted in said carrier and consisting of an electrically non-conductive material and corresponding in number to the intended number of cigarettes in the assembly thereof in said pocket, each pin being provided with an abutment, a helical electro-conductive metal spring encompassing each feeler pin and each having a front end engaging said abutment of one of said pins, respectively, said carrier having rear and front electro-conductive metal abutment supporting the rear and front ends of said springs respectively, means for periodically relatively moving said casing and said pocket towards each other, each of said springs being sufficiently soft, that when its corresponding pin yields by engaging a cigarette in said pocket, as to be compressed by said pin to make its front end yield away from said front electro-conductive abutment, and electrical contact means on said pocket and said carrier respectively, relatively located to engage each other when moved toward each other.

2. In detecting means for use in cigarette assembling and packaging apparatus, said detecting means comprising a pocket receiving an assembly of cigarettes, a pin carrier, a plurality of feeler pins slidably mounted in said carrier and consisting of an electrically non-conductive

material and corresponding in number to the intended number of cigarettes in the assembly thereof in said pocket and each said pin having a freely projecting end for abutting a cigarette in said pocket, each of said pins having spring engaging means, a helical electro-conductive metal spring encompassing each feeler pin and each having a front end portion engaging with said spring engaging means of one of said pins, respectively, said carrier having a rear electro-conductive metal abutment supporting the rear ends of said springs and a front electro-conductive metal abutment engaged by the front end of each spring, means slidably guiding said pins and located between said front abutment and said freely projecting ends of said pins, means for periodically and relatively moving said pin carrier and said pocket toward each other, said springs being sufficiently soft, that, when its corresponding pin yields by engaging a cigarette in said pocket as to be compressed by said pin to make its front end yield away from said front abutment and thereby to prevent the establishment of electro-conductive contact between said respective springs and said front metal abutment of said carrier, and electrical contact means on said pocket and said carrier respectively, relatively located to engage each other when moved toward each other.

3. In detecting means for use in cigarette assembling and packaging apparatus, said detecting means comprising a pocket receiving an assembly of cigarettes, a carrier, a plurality of feeler pins slidably mounted in said carrier and consisting of an electrically non-conductive light-weight material and corresponding in number to the intended number of cigarettes in the assembly thereof in said pocket, and said pins each having an end portion projecting freely from said carrier for abutting a cigarette in said pocket, a tapered helical metal spring enclosing each feeler pin and having a narrowed front end fixedly engaging one of said pins, respectively, and a rear butt end, said carrier having a rear electro-conductive metal abutment engaging said butt ends of said springs and a front electro-conductive metal abutment for engaging the front end of each said spring, said carrier having means slidably guiding said pins and located only between said front electro-conductive abutment and said freely projecting ends of said pins, means for periodically and relatively moving said pin carrier and said pocket towards each other, said springs being sufficiently soft, that, when a pin yields by engaging a cigarette in said pocket, as to be compressed by said pin to make its front end stay away from said front electro-conductive abutment and thereby to prevent the establishment of a closed circuit through said spring, and electrical contact means on said pocket and said carrier respectively, relatively located to engage each other when moved toward each other.

4. In detecting means for use in cigarette assembling and packaging apparatus, said detecting means comprising a pocket receiving an assembly of cigarettes, a detecting pin carrier, a plurality of feeler pins slidably

mounted in said carrier and consisting of an electrically non-conductive material and the number of said pins corresponding to the intended number of cigarettes in the assembly thereof in said pocket, each said pin having an end freely projecting from said carrier for abutting a cigarette in said pocket, a tapered helical metal spring enclosing each feeler pin and having a narrowed front end portion screwed to its said pin, respectively, and having a rear butt end, said carrier havig a rear electro-conductive metal abutment supporting said butt ends of said springs and a front electro-conductive metal abutment for supporting the front end of each said spring, said carrier having means slidably guiding said pins, said means being located only between said front abutment and said freely projecting ends of said pins, means for periodically moving said carrier and said pocket relatively towards each other, said spring being so soft, that, when a pin yields by engaging a cigarette in said pocket, it is compressed by said pin to make its front end yield away from said front electro-conductive abutment, and electrical contact means on said pocket and said carrier respectively, relatively located to engage each other when moved toward each other.

5. In detecting means for use in cigarette assembling and packaging apparatus, said detecting means comprising a pocket receiving an assembly of cigarettes, a detection pin carrier, a plurality of feeler pins slidably mounted in said carrier and consisting of an electrically non-conductive material and corresponding in number to the intended number of cigarettes in the assembly thereof in said pocket, and each said pin having an end freely projecting from said carrier for abutting a cigarette in said pocket, a tapered helical metal spring enclosing each feeler pin and having a narrowed front end fixedly engaging one of said pins, respectively, and having a rear butt end, said carrier having a rear metal abutment engagingly supporting said butt ends of said springs and a front metal abutment engagingly supporting the front end of each said spring, said carrier having means slidably guiding said pins and being located only between said front abutment and said freely projecting ends of said pins, means for periodically and relatively moving said pin carrier and said pocket towards each other, said spring being so soft that when a pin yields by engaging a cigarette in said pocket, it is compressed by said pin to make its front end yield away from said front electro-conductive abutment, said narrowed end of each said spring having a convolution forming an annular flange adapted to form a contact member abutting said front electro-conductive abutment of said carrier, an electrical contact means on said pocket and said carrier respectively, relatively located to engage each other when moved toward each other.

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