Sept. 4, 1934. D. B. KIDD 1,972,657

CIGARETTE PACKING MACHINERY

Filed May 1, 1931 3 Sheets-Sheet 1

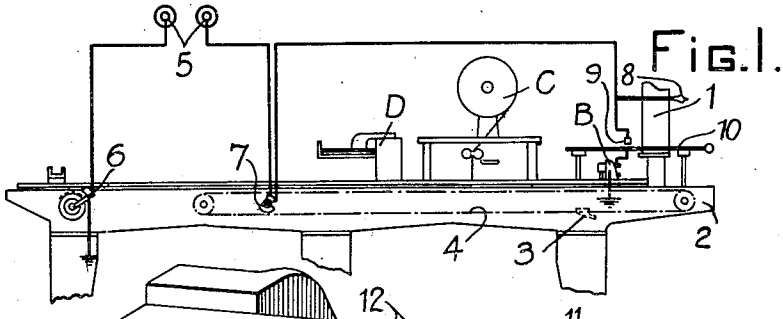


Fig. 1.

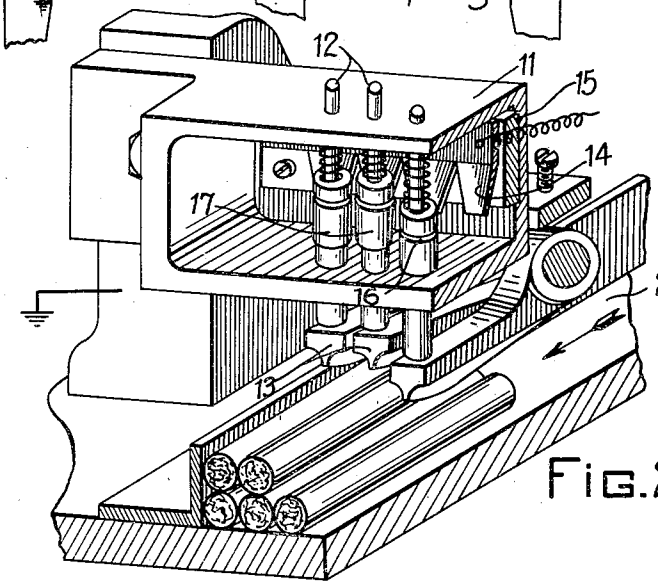


Fig. 2.

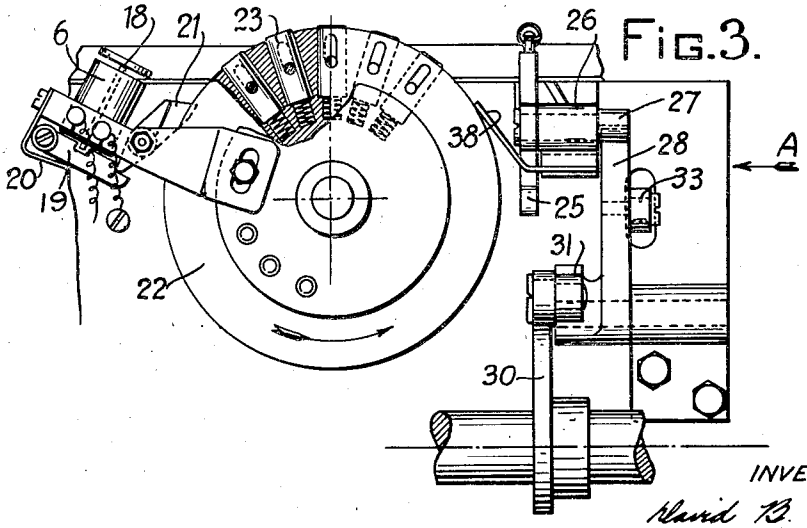


Fig. 3.

INVENTOR

David B. Kidd,

By Watson, Cole, Morse & Grindle

Attys

Sept. 4, 1934. D. B. KIDD 1,972,657

CIGARETTE PACKING MACHINERY

Filed May 1, 1931 3 Sheets-Sheet 2

Fig.6.

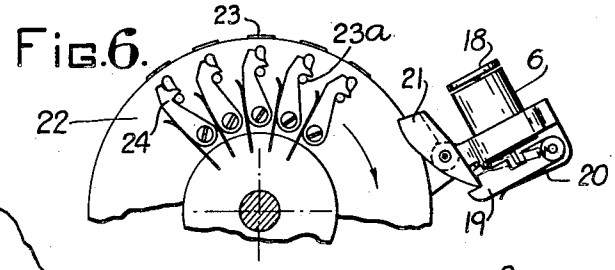


Fig.5.

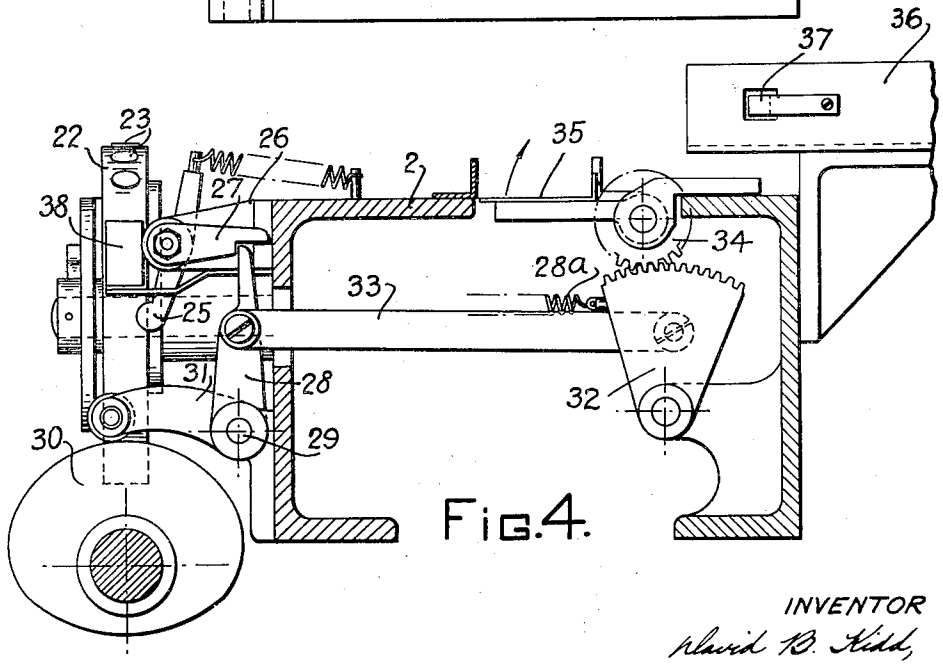


Fig.4.

INVENTOR

David B. Kidd,

By Wheaton, Coit, Morse & Grindle

Attys

Sept. 4, 1934. D. B. KIDD 1,972,657

CIGARETTE PACKING MACHINERY

Filed May 1, 1931 3 Sheets-Sheet 3

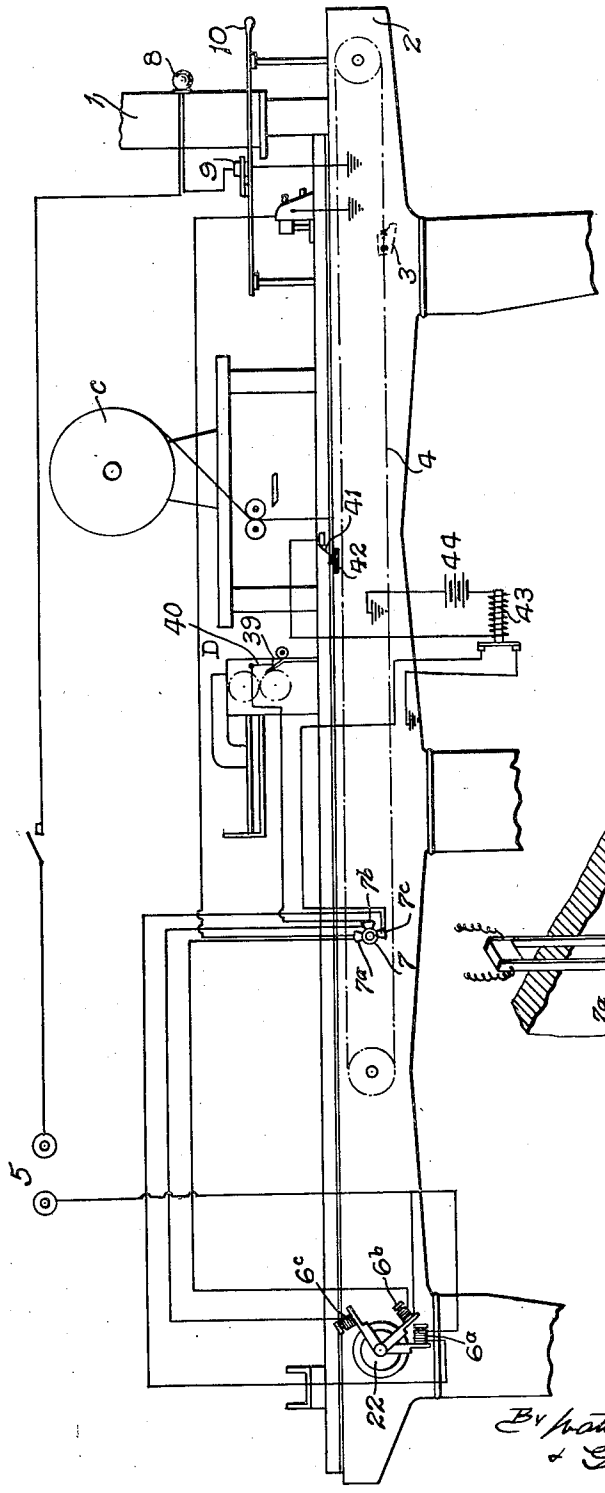


Fig. 7.

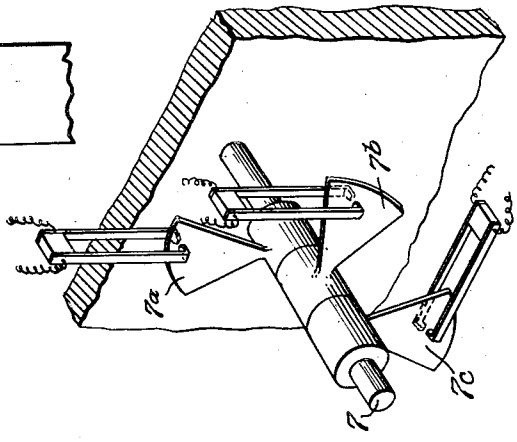


Fig. 8.

Inventor
D. B. Kidd,
By Watson, Coit, Moore & Grindle
Atty's.

Patented Sept. 4, 1934 1,972,657

UNITED STATES PATENT OFFICE

1,972,657

CIGARETTE PACKING MACHINERY

David Blewes Kidd, London, England

Application May 1, 1931, Serial No. 534,414
In Great Britain May 22, 1930

2 Claims. (Cl. 226—5)

This invention relates to cigarette packing machinery, and has for its object to provide means whereby an incompletely filled or otherwise defective package may be marked or otherwise distinguished, or if desired, automatically ejected from the machine.

The invention consists of an apparatus for use on a cigarette packing machine comprising means for detecting whether one or more of the elements (for example, the cigarettes, the foil wrapping or the carton) forming a complete packet is absent, said means electrically operating a device which ensures that any packet which is deficient of one or more of said elements will not be issued as a normal product of the machine.

The invention will be more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 is a diagram of the packing machine showing the electric circuit necessary when the invention is applied thereto.

Fig. 2 is a perspective view, partly in section, showing the device for detecting if a cigarette is missing.

Fig. 3 is a side view of a portion of the machine showing the magnet which is actuated by the operation of the device shown in Fig. 2 and the co-operating parts.

Fig. 4 is a view of Fig. 3 in the direction of the arrow "A", the bed of the machine being shown in section.

Fig. 5 is a plan view of Fig. 4.

Fig. 6 is a fragmentary view of the magnet and wheel shown in Fig. 3, the view being taken in the opposite direction.

Figure 7 is a diagram corresponding generally to Figure 1 illustrating in more detail a suitable circuit for an arrangement employing three detectors, and

Figure 8 is a perspective view of a rotary switch comprising an element of the circuit.

Referring to the drawings, the cigarettes are fed from a hopper 1 to the bed 2 of the machine and carried along in batches by pusher pieces 3 attached to an endless chain conveyor 4.

Each batch of cigarettes is carried through the detecting device "B", and in the present instance through a foiling apparatus "C" and a blank feeding apparatus "D". The foil feeding and blank feeding apparatus are only shown diagrammatically, as it will be obvious that the cigarettes may be packed in any desired manner, and on any type of machine, without departing from the invention.

The electric circuit commences with the source of supply 5 and on one side passes to one terminal of a magnet 6 and thence to the frame of the machine. On the other side the current passes to a rotary switch 7 and thence to a warning lamp 8 and afterwards to a terminal block 9.

Connection is made to the terminal block 9 by an insulated block carried on the striking bar 10 of the machine, and a connection from this block passes to spring contacts in the detecting device "B", and when the necessary connection is made owing to the absence of a cigarette, to the frame of the machine.

The block on the striking bar is so arranged that when the machine is stopped, the circuit is completely broken until the striking bar is moved again to start the machine.

The rotary switch 7 causes the circuit to be completed during the time that the cigarettes are passing through the detecting device and at all other points of the cycle, the circuit is dead.

Referring more particularly to Fig. 2, it will be seen that the detecting device consists of a frame 11 carrying a series of spring plungers 12. The plungers press on pivoted levers 13, each of which lies directly in the path of a cigarette so that as a batch of cigarettes pass, all the levers 13 are lifted, but if one cigarette is absent, the corresponding lever does not lift.

A series of spring fingers 14 rub on the plungers 12, the fingers being mounted on an insulating block 15 and connected to the circuit. Each plunger has an insulating sleeve 16 which is arranged to insulate a brass sleeve 17 entirely from the plunger.

When a cigarette passes beneath each of the levers 13, the plunger is raised, and the corresponding spring finger is then in contact with the insulated sleeve 17 so that no current passes, but if a cigarette is missing as shown in the case of the outer plunger, the plunger does not lift and the spring finger 14 remains in contact with the top portion of the plunger and therefore in direct contact with the frame of the machine. Consequently, whenever a cigarette is missing one of the plungers causes the circuit to be made (the rotary switch 7 "making" at this instant) and the passage of the current energizes the magnet 6.

The cigarette feeding apparatus is so designed that the cigarettes are quite free to fall on to the bed of the machine and consequently if a cigarette is missing, the corresponding gap will always occur in the upper row of the batch as

the cigarettes will roll and fill up the whole of the space in the bottom row. When the magnet 6 is energized its armature 18 is attracted and a pivoted lever 19 is thrust away from the magnet against the action of the spring 20.

The lever 19 forms a latch which holds a pawl 21 in the position shown in Fig. 3. The pawl is under spring tension and immediately the latch 19 is released, the larger end of the pawl moves nearer to the wheel 22. The wheel 22 is rotated in synchronism with the rest of the machine and has a number of spring pressed plungers 23 which are normally held in the inward position by pivoted spring catches 24 which engage pins 23^a fixed to the plungers 23 (see Fig. 6).

When the pawl 21 moves inwards towards the wheel it causes the next succeeding catch 24 to move on its pivot, thus releasing the corresponding plunger 23 which is pushed outwardly by its spring. The pawl 21 is angular in section and a portion of the same lies in line with the path of the plungers 23 as the latter rotate, and consequently, immediately a plunger is released and moves outwards it simultaneously pushes the pawl 21 and rotates it slightly about its spindle so that the latch 19 can move towards the body of the magnet under the pressure of the spring 20, thus re-setting the latch which once more holds the pawl 21 in the position shown in Fig. 3.

As the wheel 22 continues to rotate in the direction of the arrow shown in Fig. 3, the projecting plunger will eventually come into contact with the end of a spring controlled lever 25 and rotate it slightly about its pivot in a counter-clockwise direction (Fig. 4).

The lever 25 is pivoted on a bracket 26 and a latch lever 27 engaging with an extension on a lever 28 is fixed to the other end of the spindle which carries the lever 25. The movement of the lever 25 therefore causes the latch 27 to rise (Fig. 4) and permit the lever 28 pivoted at 29 to move about its pivot. The arrival of the projecting plunger 23 at the point where it contacts with the lever 25 synchronizes with the lower part of the cam 30, arriving beneath the roller on the arm 31 so that immediately the latch 27 permits the lever 28 to move, the cam roller on arm 31 which is integral with the lever 28 drops under the action of spring 28^a, and this movement swings the quadrant 32 about its pivot through the medium of the link 33. The rotation of the quadrant 32 causes a pinion 34 to move and the spindle of the pinion has an ejector plate 35 attached thereto, so that a packet located on the ejector plate is swung through 90° and delivered into a guide channel 36 provided with retaining catches 37. Further rotation of the cam 30 lifts the arm 31 and through the quadrant 32 restores the ejector plate 35 to the position shown in Figure 4, the latch lever 27 dropping into latching relationship with the lever 28.

The magnet 6 is so arranged with respect to the wheel 22 that the operation of the magnet by the passage of an imperfect batch of cigarettes at the detector position causes a particular plunger to protrude from the wheel, and after the wheel has rotated through the angle between the magnet and the lever 25 the same plunger presses on the lever 25 and the operation of the lever 25 causes the said imperfect batch, which has by this time arrived at the ejecting position, to be ejected by the plate 35 and delivered into the channel 36.

Further rotation of the wheel 22 brings the projecting plunger 23 beneath a fixed plate 38 which presses the plunger inwards so that the plunger catch 24 once more engages the small pin 23^a projecting from the plunger and holds it in position.

It will be seen that in Fig. 1 a foil feeding apparatus C and a blank feeding apparatus D are shown, the figure representing a typical machine for wrapping cigarettes in paper packets. It will be appreciated that detecting devices may be fitted to these two units and operated if either of the units fail to feed a sheet of foil or outer wrapper, respectively.

In the case of the blank feeding apparatus D the blanks are arranged to pass over a guide plate 39 during feeding, and above the said guide plate is arranged a very light steel spring 40 connected to the circuit which includes the magnets 6 and the switch segment 7^b. The spring 40 normally touches the guide plate, but as the blanks pass over the guide they separate the spring from the plate. At this instant the segment 7^b is in such a position that the two wires leading to it are joined by contacts so that if a blank is not fed at the proper time, the electric circuit is completed and the ejecting apparatus is caused to work as above described.

In the case of the foil feeding unit C, the device is slightly different, because the foil is a conductor. As the foil is passing along the bed of the machine, one of the side flaps passes beneath a spring 41 which is carried on an insulating block, the extremity of the spring touching a similar insulating block 42 fitted flush with the surface of the machine bed. The spring is connected to a relay 43 through a battery 44 to the machine bed so that as a strip of foil passes the spring is earthed by it as the foil, of course, is touching the machine bed with most of its surface and the relay is operated. The armature of the relay therefore moves over and breaks the circuit of the magnet 6^a, the circuit being completed through the switch segment 7^c. If a strip of foil fails to pass, the magnet is operated as the switch segment 7^c makes contact at the appropriate time and therefore the package passing the foil apparatus at the time will eventually be ejected from the machine, in the manner previously described.

Each detecting device is connected by a separate sector on the rotary switch 7, the segment 7^a being connected to the cigarette detector and the segments 7^b and 7^c as above described.

The various magnets are disposed at different positions around the disc 22 to agree with the several positions of the detecting devices; 6^a being for the foil, 6^b for the cigarettes and 6^c for the blank.

When the machine is working, the operation of the detecting device causes the lamp 8 to light up and warn the machine attendant that the machine is not functioning correctly as it may happen that an obstruction in the machine will cause a series of packets to be incompletely filled, and it is desirable to warn the operator so that the fault can be remedied as soon as possible.

Alternatively a bell may be used to give the required warning, and a main switch may be incorporated in the circuit so that the machine may be run without the detecting device operating under any circumstances.

In another arrangement the detecting device may be caused to open a relief valve on the suction feed apparatus of a stamp applying unit connected to the machine so that no stamp will be fed for an incomplete packet.

Obviously the invention may be applied to any kind of packing machine, for example, to a machine for packing cigarettes in slide and shell cartons, in which instance the operation of the detecting device is arranged to prevent the feeding of a shell so that the slide is ejected from the machine in the open condition.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In apparatus for use on cigarette machines, the combination with means for feeding cigarettes through a predetermined path in successive batches, of means disposed at one point in the said path for detecting the absence of a cigarette from a batch, and mechanism controlled by said last named means for removing a faulty batch at a point displaced from said first named point, said mechanism including a rotatable element driven in timed relation to said feeding means, spring pressed plungers carried by said element, each allocated to a batch of cigarettes, means normally retaining said plungers in inoperative position, a device actuated by said detecting means on the presence of a faulty batch for releasing and rendering operative the plunger allocated to that batch, and means having a portion thereof spaced circumferentially of said element with respect to said device and extending into the path of movement of a released plunger for actuation thereby to remove the faulty batch.

2. In apparatus for use on cigarette machines, the combination with means for feeding cigarettes through a predetermined path in successive batches, of means disposed at one point in the said path for detecting the absence of a cigarette from a batch, and mechanism controlled by said last named means for removing a faulty batch at a point displaced from said first named point, said mechanism including a rotatable element driven in timed relation to said feeding means, spring pressed plungers carried by said element, each allocated to a batch of cigarettes, means normally retaining said plungers in inoperative position, a device actuated by said detecting means on the presence of a faulty batch for releasing and rendering operative the plunger allocated to that batch, means having a portion thereof spaced circumferentially of said element with respect to said device and extending into the path of movement of a released plunger for actuation thereby to remove the faulty batch, and fixed means located adjacent said element for engaging and resetting a released plunger to operative position.

DAVID BLEWES KIDD.