Feb. 23, 1932. M. P. E. HOHN ET AL 1,846,808

APPARATUS FOR MECHANICALLY SEPARATING OUT CIGARETTES WITH TIPS DIFFERING FROM THE NORMAL LENGTH

Filed July 9, 1929 2 Sheets-Sheet 1

Fig. 1

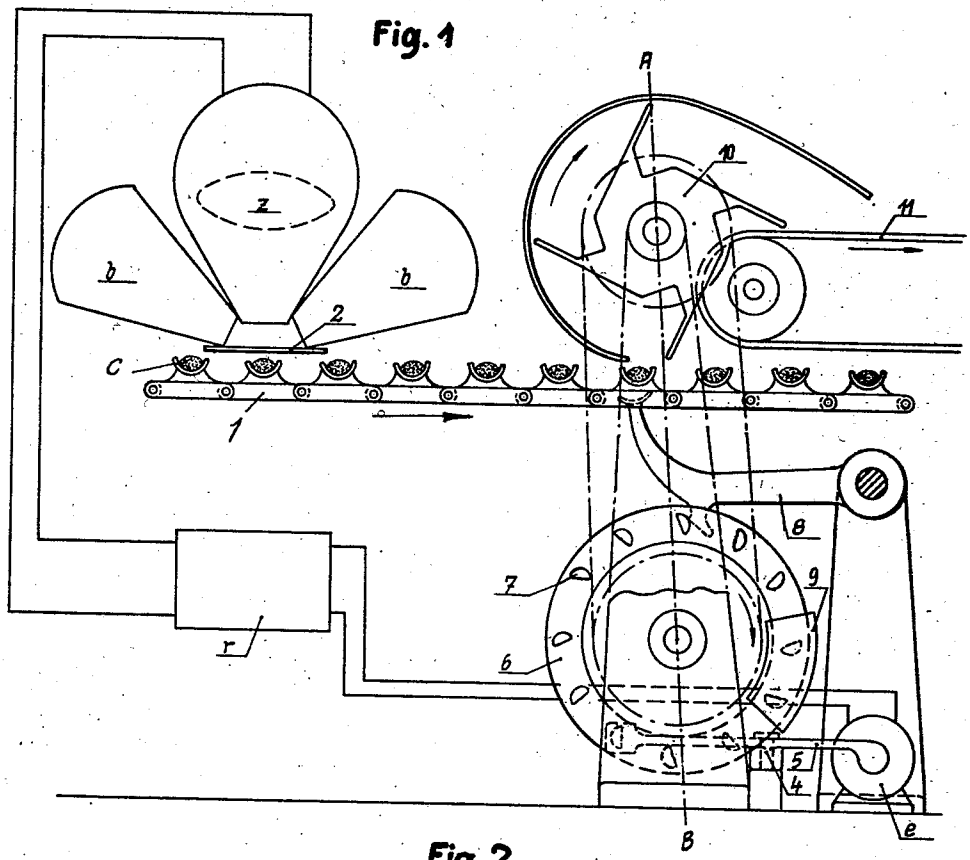
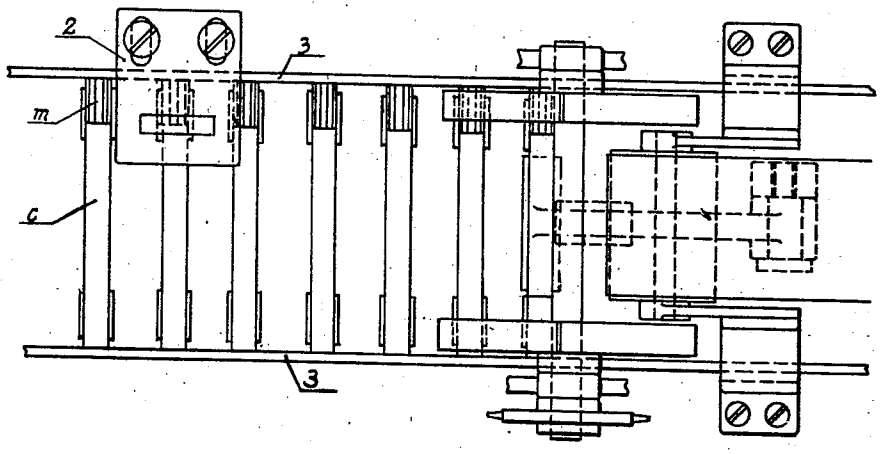


Fig. 2



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Fig. 3

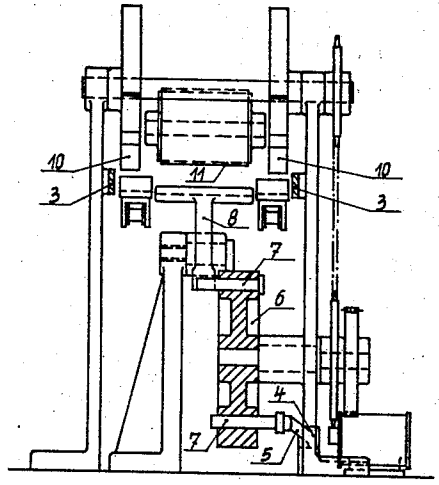
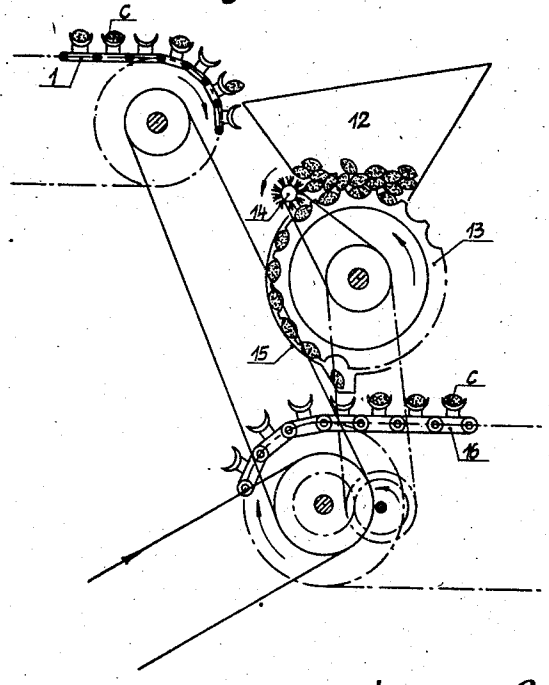


Fig. 4



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UNITED STATES PATENT OFFICE

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APPARATUS FOR MECHANICALLY SEPARATING OUT CIGARETTES WITH TIPS DIFFERING FROM THE NORMAL LENGTH

Application filed July 9, 1929, Serial No. 376,935, and in Germany July 11, 1928.

The present invention relates to apparatus for separating out cigarettes having tips or mouthpieces of a length differing from a prescribed length. The method consists in leading the cigarettes past an optical-electric feeling device which is set for the limits of the length of tip and which by means of a relay controls a device for separating out faulty cigarettes.

In the production of cigarettes with mouthpiece tips in cigarette rod making machines inexactitudes occur between the feed of the rod and the cutting operation, and cigarettes having tips of different lengths are produced. Before this mistake can be corrected by adjusting devices in the high speed machines of to-day a large number of cigarettes are produced having tips of obviously different length.

The invention makes use of the known (optical-electrical) feeling device, which has been employed for arranging cigarettes provided with imprints. This device responds to differences in illumination produced by the presence or absence of the imprint from the side of the cigarette facing the optical "eye" and operates by means of a relay mechanical means for turning the cigarettes around their longitudinal axes.

The method, in accordance with the invention, is preferably employed with a device of this nature so that cigarettes which are faulty as regards the length of the tip are not required to be further tested as to their correct position and direction.

The feeling device for the purposes of the new method is so arranged that it tests the limiting range of length of tip of the cigarettes fed beneath it always in a uniform position. According as the tip projects more or less into the area under examination the light strength is affected because the cigarette tips have different light reflecting properties from the body of the cigarette and with a definite degree of influence a relay is operated which operates a mechanical device for separating out the faulty cigarettes.

Preferably, the cigarettes are led in succession past two optical-electrical feeling devices each of which co-operates with a separating device of which the one separates out cigarettes having excessively long tips and the other separates out cigarettes having excessively short tips.

In the apparatus for carrying the method into effect there is provided a chain with pockets which chain feeds the cigarettes beneath the optical-electrical feeling device a disc rotating about a horizontal axis beneath it. This disc is provided on its periphery with axially movable pins disposed parallel to the axis of the disc. The pins are displaced axially electro-magnetically by means of a relay connected with the optical-electrical feeling device on the passage of a faulty tip and in this position influence a lifting finger delivering the faulty cigarettes from a chain into the path of a roller fitted with blades, whereupon the pins are returned by an inclined surface again into their initial position.

When the faulty cigarettes are to be ejected the problem arises how the gaps in the feeding chain resulting from the ejection of the cigarettes are to be filled.

These gaps are preferably filled by leading the conveyor after it leaves the separating device and carrying the cigarettes with intervening gaps to the filling hopper of a device which supplies the pockets of a second conveyor (pocket chain), the speed of feed of the second conveyor being less corresponding to the number of cigarettes separated out, than the speed of feed of the first conveyor.

A suitable construction showing merely what is required merely for a clear understanding of the invention, is illustrated in the accompanying drawings, in which Fig. 1 is a side elevation and Fig. 2 a plan, while Fig. 3 is a vertical section on the line A—B of Fig. 1. Fig. 4 shows the filling device in vertical longitudinal section.

Referring to the drawings, 1 indicates a pocket chain which at a point to the left of Figs. 1 and 2 is fed mechanically with the cigarettes which are to be examined. On the machine frame is mounted a slotted screen 2 over which the illuminating apparatus *b b* and the light sensitive cell *z* indicated merely diagrammatically are arranged.

The screen slot lies over the limiting range of the mouthpiece tips *m*. The cigarettes are led by means of the guide bars 3 in exactly similar position beneath the screen. At *r* (Fig. 1) is located a relay of known kind also shown diagrammatically only, which relay is connected by conductors with the light sensitive cell *z* and with the electro-magnet *e*.

Adjacent to the magnet armature 5 which turns about a vertical axis at 4 is rotated a disc 6 having axially movable pins 7 disposed parallel to the axis of the disc and by which the lifting finger 8 is actuated. As it is intended to remove only faulty cigarettes from the pockets of the chain 1, only those pins 7 are operated which correspond to pockets in which the faulty cigarettes are located. There must thus exist a definite relation between the divisions of the pocket chain and the division of the disc 6 or between the speed of movement of the chain and of the disc. The pins 7 are rendered operative or inoperative by axial displacement in the holes in the disc 6, i. e. they are moved into or out of the path of the lifting finger 8. Those pins which act on the lifting finger 8 are pushed forward by the armature 5. After the pins pushed forward have acted on the lifting finger they are returned to the inoperative position by moving over an inclined surface 9. The cigarettes *c* raised by the lifting finger, move into the path of the rotating gripper 10 which grips them from beneath at both sides of the pocket and in its further movement delivers them on to the feed band 11. The apparatus described thus separates the cigarettes faulty in one respect, either the cigarettes with too long or too short tips. At another point on the chain may be disposed a second similar device similarly disposed with respect to the screen slot and so on and intended to locate the opposite fault.

Fig. 4 shows at the left hand upper side the right hand end of the pocket chain 1 which has passed under the optical feeling device and the separating device and has empty pockets. The filled pockets deposit the cigarettes in the filling hopper 12 of the feeding device beneath which the pocketed drum 13 rotates. Its pockets are filled from the filling hopper 12, the roller brush 14 at the outlet end in known manner retaining any excess cigarettes which might be entrained. The filled pockets pass along a channel formed by the cover 15 and fall into the pockets in the pocket chain 16. This represents the second section of the conveyor path and leads the cigarettes now filling all the pockets to a station for further treatment.

The pocket chain 16 is driven more slowly than the pocket chain 1. The relation of the speeds is determined from the experienced proportion of faulty cigarettes to the total delivered. A definite transmission ratio may then be used particularly if it is so chosen that the filling hopper 12 cannot normally be emptied but overfilled. The excess would then be removed by the operator attending the machine. On this assumption also the supply of the pocket chain 16 is more than sufficient for the packing machine. A change speed gearing may be provided, however, of which the speed of the second portion of the conveyor track can be altered in relation to the first as required.

We claim:

1. Apparatus for mechanically separating out cigarettes with tips differing from the normal length, comprising an optical-electrical feeling device set to the limits of the length of the tips, means for leading the cigarettes past said device, a device for separating out faulty cigarettes, and a relay controlled by said feeling device for operating said separating out device.

2. Apparatus for mechanically separating out cigarettes with tips differing from the normal length, comprising two optical-electrical feeling devices, means for leading said cigarettes past said devices, and a separating device cooperating with each of said feeling devices, one serving to separate out cigarettes having too long and the other to separate out cigarettes having too short a tip.

3. Apparatus for mechanically separating out cigarettes with tips differing from the normal length, comprising an optical-electrical feeling device set to the limits of the length of the tips, means for leading said cigarettes past said device means for separating out faulty cigarettes, a relay controlled by said feeling device for operating said separating out means and means for filling the gaps remaining from such separation.

4. Apparatus for separating out cigarettes having tips differing from the normal length comprising a pocket chain in which the cigarettes are carried, an optical-electrical feeling device located over said chain, a disc located beneath said chain, said disc provided with horizontally disposed pins, a relay connected with said feeling device and serving to displace said pins axially on passage of a faulty cigarette, a lifting finger operable by said pins to remove faulty cigarettes from the pockets, a gripper adapted to receive the cigarettes thus removed and separate them, and means for returning the pins to initial position.

5. Apparatus for separating out cigarettes having tips differing from the normal length comprising a pocket chain in which the cigarettes are carried, an optical-electrical feeling device located over said chain, a disc with horizontally disposed pins located beneath said chain, said disc provided with horizontally disposed pins, a relay connected with said feeling device and serving to displace said pins axially on passage of a faulty cigarette, a lifting finger operable by said pins

to remove faulty cigarettes from the pockets, a gripper adapted to receive the cigarettes thus removed and separate them, a filling hopper located at the discharge end of the pocket chain and adapted to receive the cigarettes from the pockets and a second pocket chain beneath said filling hopper the pockets of said second pocket chain being adapted to be filled with cigarettes from said filling hopper.

6. Apparatus for mechanically separating out cigarettes with tips differing from normal length comprising an optical-electrical device set to the limits of the length of the tips, means for leading said cigarettes past said device, means for separating out faulty cigarettes and means controlled by said optical-electrical device, for actuating said separating out device.

In testimony whereof we affix our signatures.

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