June 24, 1924. 1,499,205

G. C. EKSTRÖM ET AL

METHOD AND MEANS FOR SEPARATING DEFECTIVE FROM PERFECT CIGARETTES

Filed July 7, 1921 3 Sheets-Sheet 1

Fig. 1.

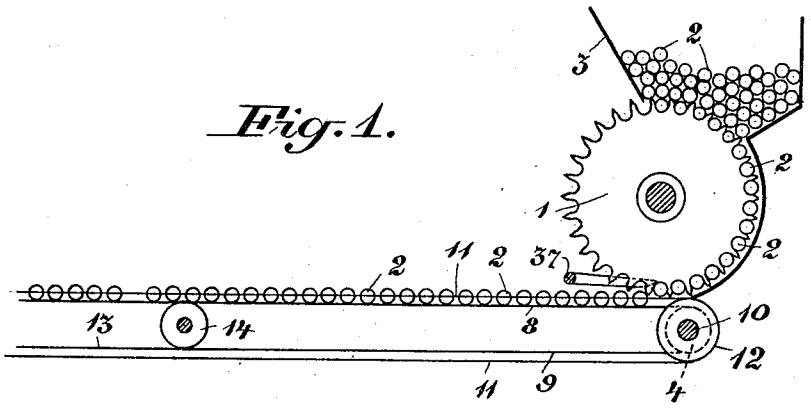


Fig. 2.

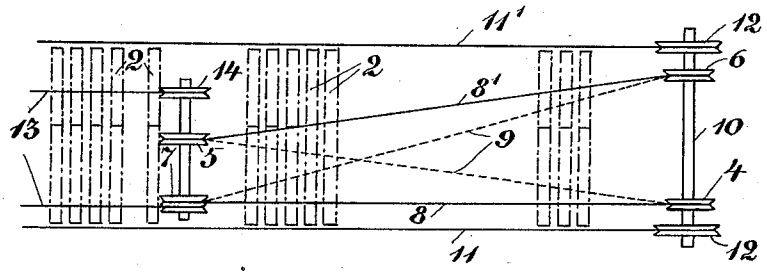
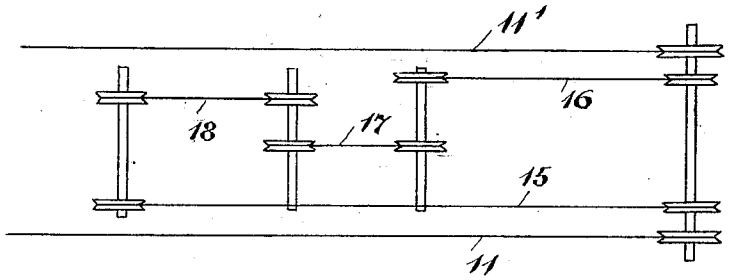


Fig. 3.



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Fig. 4.

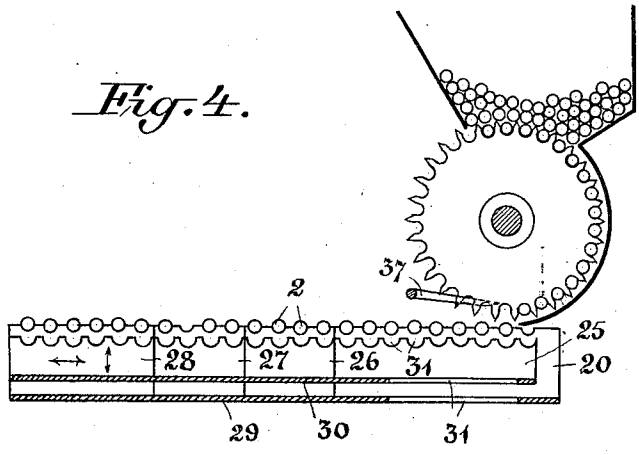


Fig. 5.

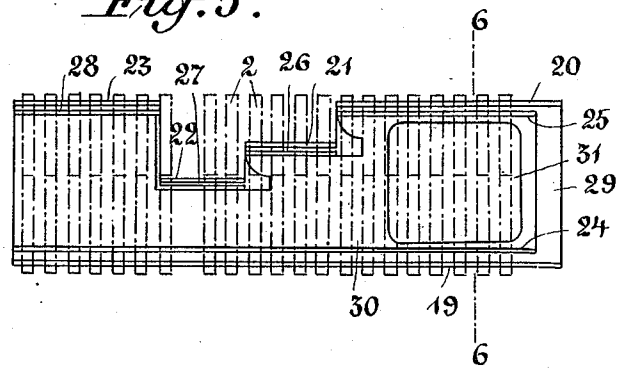
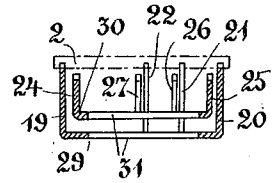


Fig. 6.



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Fig. 7.

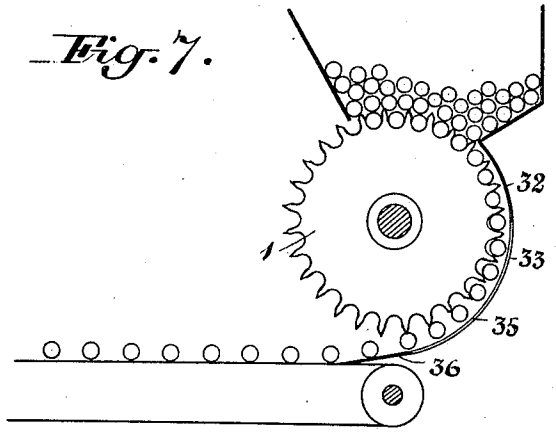
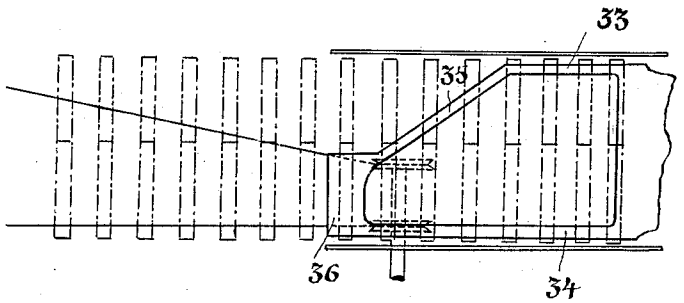


Fig. 8.



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UNITED STATES PATENT OFFICE.

GUNNAR CHRISTIAN EKSTRÖM AND BROR ANDERS EMIL JOHNSON, OF STOCKHOLM, SWEDEN, ASSIGNORS TO AKTIEBOLAGET GERH. AREHNS MEKANISKA VERKSTAD, OF STOCKHOLM, SWEDEN, A CORPORATION OF SWEDEN.

METHOD AND MEANS FOR SEPARATING DEFECTIVE FROM PERFECT CIGARETTES.

Application filed July 7, 1921. Serial No. 483,065.

To all whom it may concern:

Be it known that we, GUNNAR CHRISTIAN EKSTRÖM, a subject of the King of Sweden, and resident of Eriksbergsgatan 14, Stockholm, in the Kingdom of Sweden, and BROR ANDERS EMIL JOHNSON, a subject of the King of Sweden, and resident of Observatoriegatan 7, Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in the Methods and Means for Separating Defective from Perfect Cigarettes, of which the following is a specification, reference being had therein to the acompanying drawings.

During the charging or filling action of cigarette tubes with tobacco it sometimes happens, that some tubes are not at all charged or are incompletely charged or that the tubes are compressed longitudinally, so that the paper tube bursts or the cigarette is broken or becomes defective in other respects. The separation of empty tubes and broken or defective cigarettes has heretofore been effected manually. If the person, who effects the said separation, does not pay due attention to the work, it may happen that empty tubes and defective cigarettes accompany the perfect cigarettes and are introduced into the boxes etc. In order to prevent such faults the said separation according to this invention is effected automatically. The present method is based upon the fact that, concerning cigarettes provided with mouth pieces of paper or the like, the centre of gravity of an empty tube or a tube incompletely charged with tobacco is located nearer to the mouth piece (or on the same) than the centre of gravity of a filled cigarette. It will be the same if the cigarette is compressed longitudinally. According to the invention the cigarettes are moved along a path, carrying the same and so arranged, that perfect cigarettes are sustained during their whole travel along the said path, while defective cigarettes are deprived of their support either by the path having parts, sustaining the cigarettes, which are located at a distance from each other, which is greater than the length of the broken or compressed cigarette, or by the centre of gravity of the defective cigarette or the empty tube being located outside the path, so that the cigarette or tube loses its balance and tumbles down from the path.

In the accompanying drawings Fig. 1 shows in a side view and Fig. 2 in a plan view a device for carrying out the said separating method. Fig. 3 shows in a plan view a second device for separating empty tubes and defective cigarettes. Figs. 4, 5 and 6 show in a longitudinal section, a plan view and in a section on the line 6—6 of Fig. 5 respectively a third device for effecting the said separation. Figs. 7 and 8 show in a side view and in a plan view (developed) a device effecting the separation at the ordinary conveyer or feed drum. All figures show the devices diagrammatically.

With particular reference to Figs. 1 and 2, there is provided a rotating drum 1 which is formed in its peripherical surface with grooves, receiving cigarette tubes 2 provided in a funnel shaped receptacle 3 and moving the said tubes to a device adapted to charge the tubes with tobacco. The said device may be of any suitable construction and is not shown. The charged tubes are delivered on a path, consisting of a thread 8, 9, 8^1, 9 carried by groove pulleys 4, 5, 6 and 7. The lower crossed parts 9 of the said thread are shown by dotted lines in Fig. 2. The shaft 10 of the pulleys 4 and 6 is rotated by any suitable means. The cigarettes are moved forward by the parts 8, 8^1 and guided by two parallel threads 11 and 11^1, driven by pulleys 12 on the shaft 10. The part 8 is parallel with the guide thread 11. The part 8^1 on the other hand successively approaches the part 8. The greatest distance between the parts 8, 8^1 is so adapted, that cigarettes greatly compressed longitudinally and broken cigarettes cannot be sustained by the parts 8, 8^1 but fall down through the space between the same. The minimum distance between the parts 8, 8^1 is so adapted, that the centre of gravity of perfect cigarettes is located somewhat inside the part 8^1 i. e. between the parts 8, 8^1, so that the cigarettes remain on the said parts and are transported by the same to a second conveyer, consisting for instance of two parallel threads 13, driven by groove pulleys 14. Empty or incompletely charged tubes and cigarettes com-

pressed longitudinally on the other hand, the centre of gravity of which, as stated above, is located on or nearer to the mouth piece, arrive during the transportation to a part of the path, which is so narrow, that the centre of gravity is positioned outside the part 8^1. The said tubes and defective cigarettes then lose their balance and fall down from the conveyer. In this manner empty tubes and defective cigarettes are in an automatical and reliable manner separated from the perfect cigarettes.

In the device shown in Fig. 3, 11, 11^1 designate the guide threads. The cigarettes are delivered on a path, consisting of a thread 15 and three threads 16, 17 and 18 parallel with the said thread 15. The distance between the threads 15 and 16 is so great, that greatly compressed or broken cigarettes fall down through the space between the said threads. Perfect cigarettes as well as somewhat compressed cigarettes and empty tubes or incompletely charged tubes on the other hand remain on the threads. The distance between the threads 17 and 15 is so adapted, that perfect cigarettes remain on the threads, while empty tubes and defective cigarettes fall down. The perfect cigarettes are further transported by the threads 15 and 18. All the said threads are guided and driven by groove pulleys.

In the device shown in Figs. 4 to 6 inclusive the cigarettes 2 are transported on a path comprising a stationary bar 19 and stationary bars 20, 21, 22 and 23 parallel with the said bar 19. The space between the bars 19 and 20 is so great, that greatly compressed cigarettes or broken cigarettes fall down between the bars. The space between the bars 19 and 21 is somewhat shorter than the space between the bars 19 and 20, and the space between the bars 19 and 22 is somewhat shorter than the space between the bars 19 and 21. The space between the bars 19 and 22 is so adapted, that perfect cigarettes may be moved on the same without falling down. When empty tubes or defective cigarettes on the other hand are moved on the bars 19 and 22, their point of gravity is located outside the bar 22, so that the said cigarettes lose their balance and fall down. For the moving of the cigarettes, duly guided, on the said path, bars 24, 25, 26, 27 and 28 are provided, located longitudinally of the bars 19, 20, 21, 22 and 23 respectively and close to the same. The said bars 19 to 23 inclusive are formed by the one edge of a plate 29 and upwardly bent lugs provided on the same. The bars 24 to 28 inclusive are formed in the same manner from a plate 30. All the said bars are provided in their top edges with notches 38, adapted to receive the cigarettes. The plate 30 is moved by a suitable driving mechanism forward and backward longitudinally and upward and downward, so that the bars 24 to 28 inclusive, when moved upward, catch by means of their notches cigarettes located in the notches of the bars 19 to 23 inclusive and then move the said cigarettes toward the left for a distance equal to the distance between the notches. As the plate 30 is then lowered the bars 24 to 28 inclusive leave the cigarettes into the notches of the bars 19 to 23 inclusive. The space between the bars 24 and 25 is so great, that broken cigarettes etc. can not be supported by the same. Broken cigarettes etc. fall down through openings 31 provided in the plates 29 and 30.

In the device shown in Figs. 7 and 8 the separation of defective cigarettes and empty tubes is effected during the transporting of same by reason of the drum 1. When the device is provided in a machine charging the tubes with tobacco, the charging operation may take place at 32. The cigarettes then arrive on a supporting path, shown in developed position in Fig. 8. The said path comprises two parallel parts 33, 34, so spaced that broken cigarettes etc. are not supported by the same but fall down. Perfect cigarettes as well as somewhat compressed cigarettes and empty tubes or incompletely charged cigarettes are transported, suitably guided, on the part 34 and a part 35 extending toward the part 34 in an oblique direction and arrive on a part 36, which is so narrow, that the centre of gravity of compressed or defective cigarettes and empty tubes will be located outside the said part and fall down. In order that the drum 1 may not prevent the defective cigarettes and the tubes from falling down from the said path, the space between the path and the drum successively increases, so that there is a space great enough to permit the said cigarettes etc. to turn over. Also a path concentric with the drum may be used, if the space between the path and the drum is sufficient for the said purpose. The perfect cigarettes are further transported by a path comprising threads, as shown.

Fingers 37, extending into peripherical grooves in the drum 1, Figs. 1 and 4, cause cigarettes, which may have been jammed in the grooves, to leave the grooves. Similar fingers may also be provided in the form shown in Fig. 7.

In the device shown in Fig. 3 a third thread may be provided in accordance with the bar 21 shown in Figs. 4 to 6 inclusive. The transition from the broad part to the narrowest part of the path will then not be so sudden. The successive approaching of the one border of the path to the other border, as shown in Figs. 2 and 8, is specially suitable, owing to the fact that the

cigarettes are then gradually subjected to the examination.

The present method as well as the devices for carrying out the same may be used in or adapted to machines, charging the tubes with tobacco, but also to machines constructed especially for separating empty tubes and defective cigarettes from perfect cigarettes and also to machines for charging bags, boxes and the like with cigarettes. Also, concerning cigarettes without mouth piece, broken or compressed cigarettes may be separated from perfect cigarettes in the manner stated above and by means of the devices in question.

Also other devices than those shown in the drawings for effecting the automatical separation may evidently be used. The path effecting the removing of the defective cigarettes and the empty tubes must not necessarily be located in immediate succession to the path, on which broken cigarettes etc. are removed.

We claim.

1. The method of automatically separating defective cigarettes from perfect cigarettes consisting in moving the cigarettes, suitably guided, along a path, and withdrawing the support of the said cigarettes to such extent, that empty or incompletely charged tubes or cigarettes compressed longitudinally will have their center of gravity located outside the path and in consequence thereof fall down from the same.

2. The method of automatically separating defective cigarettes from perfect cigarettes consisting in moving the cigarettes suitably guided along a path, by which perfect cigarettes are sustained near their ends and waste cigarettes are not sustained, and then further move the cigarettes on the said path and withdrawing the support of the cigarettes to such extent, that empty or incompletely charged tubes or cigarettes compressed longitudinally will have their center of gravity located outside the path and in consequence thereof fall down from the same.

3. In a device for separating defective cigarettes from perfect cigarettes the combination of members located side by side and constituting a path on which the cigarettes are moved, means guiding the cigarettes thus moved, the said members approaching each other in the motion direction, until the path becomes so narrow that the center of gravity of empty or incompletely charged tubes and cigarettes compressed longitudinally comes outside the path and the said cigarettes fall down from the path, and means located at the ends of the members for conveying the perfect cigarettes subsequent to the passage over the members.

4. In a device for separating defective cigarettes from perfect cigarettes the combination of members located side by side and constituting a path on which the cigarettes are moved means guiding the cigarettes thus moved, the distance between the said members at the entrance of the path being so great that waste cigarettes are not sustained, the members then approaching each other in the motion direction, until the path becomes so narrow, that the center of gravity of empty or incompletely charged tubes and cigarettes compressed longitudinally comes outside the path and the said cigarettes fall down from the path, and means located immediately adjacent said members for conveying perfect cigarettes subsequent to the passage of the latter over the members.

In testimony whereof we have affixed our signatures in presence of two witnesses.

GUNNAR CHRISTIAN EKSTRÖM.
BROR ANDERS EMIL JOHNSON.

Witnesses:
INEZ BOERSON,
STINA LARSON.