

[54] **TESTING OF CIGARETTES AND OTHER
SIMILAR ROD-LIKE ARTICLES**

[75] Inventor: **Eryk Stefan Doerman**, Deptford,
London, S.E. 8, England

[73] Assignee: **Molins Limited**, London, England

[22] Filed: **Jan. 22, 1971**

[21] Appl. No.: **108,734**

[52] U.S. Cl. **73/45.1**

[51] Int. Cl. **G01m 3/26**

[58] **Field of Search**..... 73/38, 41, 41.4,
73/45, 45.1, 45.2, 45.3; 209/71, 72; 131/21 R,
21 B

[56] **References Cited**

UNITED STATES PATENTS

3,266,295 8/1966 Williamson 73/38

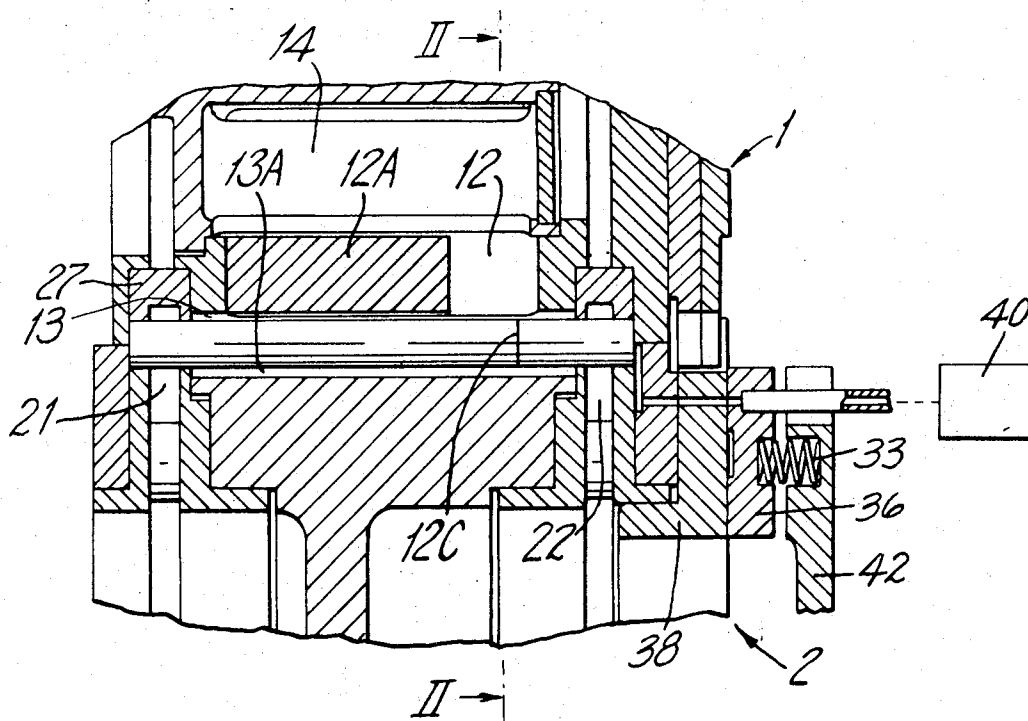
3,408,858 11/1968 Keading et al. 73/45.2
3,584,501 6/1971 Marradi et al. 73/45.1
3,608,380 7/1971 Muir et al. 73/45.1

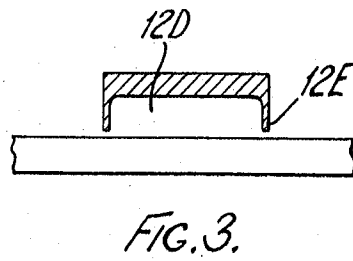
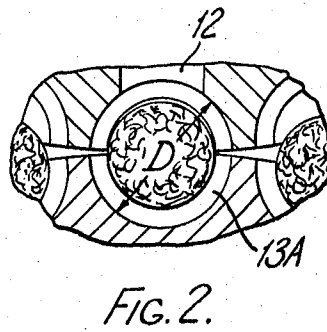
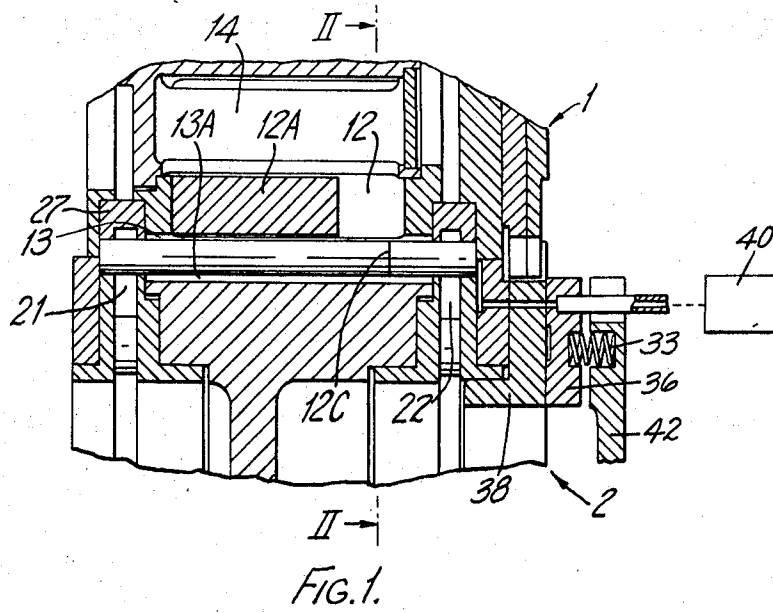
Primary Examiner—Richard C. Queisser
Assistant Examiner—Daniel M. Yasich
Attorney—Craig, Antonelli, Stewart & Hill

[57] **ABSTRACT**

A cigarette testing device comprises means producing a pressure differential between the inside and outside of the wrapper of each cigarette in turn to induce an air flow through the wrapper to detect any leaks in the wrapper, characterised by means for reducing the pressure differential along part of the wrapper so as to reduce the air flow through the wrapper in that region.

8 Claims, 3 Drawing Figures





INVENTOR

ERYK STEFAN DOERMAN

BY Craig, Antonelli, Stewart & Hill
ATTORNEYS

TESTING OF CIGARETTES AND OTHER SIMILAR ROD-LIKE ARTICLES

This invention is concerned with the testing of cigarettes and other similar rod-like articles for smoking, comprising a wrapper surrounding an air-pervious filler. For convenience the term "cigarette" will be used, but it is intended to include other similar articles.

This invention is in particular concerned with the testing of cigarettes, and especially filter-tipped cigarettes, for leaks in the wrapper.

According to the present invention a cigarette testing device comprises means producing a pressure differential between the inside and outside of the wrapper of each cigarette in turn to induce an air flow through the wrapper to detect any leaks in the wrapper, characterised by means for reducing the pressure differential along part of the wrapper so as to reduce the air flow through the wrapper in that region.

This invention is particularly useful in the case of filter-tipped cigarettes made from a wrapper paper which varies significantly in its porosity. Unless compensation is made for the varying porosity, a cigarette made from a part of the wrapper web which is excessively porous would produce an air flow through the wrapper during testing such as to suggest a faulty wrapper, even in the absence of an actual fault. On the other hand, a cigarette made from a part of the wrapper web which has a porosity below the average would tend to have a much lower air flow through the wrapper, and the presence of a hole in the wrapper might be missed because the overall air flow through the wrapper might not be above the rejection level. The present invention enables cigarette testing to be made especially sensitive in the fault-prone region of the joint between the filter and the tobacco-filled part of the cigarette, and less sensitive to porosity variations in the paper wrapper surrounding the tobacco.

In a preferred testing device according to this invention, each cigarette is carried during testing by a fluted drum, and the means for reducing the pressure differential along part of the wrapper comprises a number of pressure-reducing members carried by a second drum so arranged that one of the pressure-reducing members lies adjacent to each cigarette during test, which is carried out at a testing station situated between the two drums.

An example of a testing device according to this invention is shown in the accompanying drawings. In these drawings:-

FIG. 1 is basically identical to FIG. 2 of U.S. Pat. application, Ser. No. 795,279 filed Jan. 30, 1969, now U.S. Pat. No. 3,608,380, though with a modification according to the present invention;

FIG. 2 is a section on the line II-II in FIG. 1; and

FIG. 3 shows a modification of part of the arrangement shown in FIG. 1.

FIG. 1 is a section on the line II-II in FIG. 1 of the above-mentioned U.S. Pat. No. 3,608,380. As described in the earlier patent, during the testing of each cigarette at a testing station, suction is supplied by a supply duct to chamber 14 through a slot 12 to an annular chamber 13A formed by flutes 13 in cooperating drums 1 and 2. However, instead of the slot 12 being as long as it is in FIG. 2 of the above-mentioned patent, in the present arrangement it is shortened by the use of an insert 12A. As a result, the full suction pressure is

available only over a section of the cigarette in the region of the joint 12C between the filter tip of the cigarette (which is at the right hand end of the cigarette) and the tobacco-filled remainder of the cigarette. Thus the sensitivity to leaks in the region of this joint is not reduced.

To the left of the slot 12 the suction pressure reduces progressively during testing, being lowest at the left hand end of the annular chamber adjacent to the sealing ring 27. This is because the radial dimension of the annular chamber 13A is small and therefore produces a pressure drop during testing. For example, if the diameter of the cigarette is say 8 mm, the diameter D of the annular chamber (see FIG. 2) may for example be 11 mm.

It will be appreciated that this arrangement enables particularly large holes in the wrapper, to the left of the slot 12, still to be detected. However, the sensitivity to leaks in the wrapper reduces is reduced progressively towards the left-hand end of the cigarette. As an alternative, the insert 12A may be replaced by the insert shown in FIG. 3; this is cut away so as to define a constant-pressure space 12D so that the sensitivity to leaks over the major part of the cigarette to the left of the slot 12 is substantially uniform, the suction pressure being reduced only as a result of a pressure drop at the lip 12E. The space 12D can alternatively be vented to atmosphere if it is only desired to test for leaks in the region of the joint 12C. Air spaces 21 and 22 are open to the atmosphere. The sliding valve block 36 is resiliently urged by a spring 33 bearing on bracket 42 into engagement with the manifold ring 38 as described in the aforementioned U.S. Pat. No. 3,608,380.

In principle the present invention can be applied alternatively to a basically similar testing device in which compressed air is supplied through the slot to the annular chamber around the cigarette, or in which pressure or suction is applied to the interior of the cigarette while the pressure in the annular chamber (i.e., in the slot) is monitored by means of a suction or pressure transducer 40. A further possibility arises in the case of cigarette testing devices of the type in which air at above atmospheric pressure is delivered to the interior of each cigarette in turn while the outside of the cigarette is exposed to the atmosphere, the test for a leak being directly or indirectly dependent upon the amount of air which passes through the cigarette; in this case part of the cigarette (i.e., especially the part in the region of the insert 12A in FIG. 1) could be closely surrounded during testing with the aid of a fluted drum, so as to reduce the air flow through that part of the cigarette and thus increased the sensitivity to leaks in the region which is fully exposed to the atmosphere.

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

1. In a cigarette testing device for detecting flaws in the wrappers of filter-tipped cigarettes including means producing a pressure differential between the inside and outside of the wrapper of each cigarette in turn at a testing station to induce an air flow through the wrapper and means to detect any leaks in the wrapper produced by the said differential pressure, the improvement comprising means for applying a full pressure differential in the region of the joint between the filter and the smokable part of each cigarette, and reducing means for applying a reduced pressure differential in a

3

selected region occupied substantially entirely by at least part of the smokable part of the cigarette.

2. A cigarette testing device according to claim 1 in which each cigarette is carried during testing by a fluted drum, and in which the means for reducing the pressure differential along part of the wrapper comprises a number of pressure-reducing members carried by a second drum arranged adjacent said fluted drum so that one of the pressure-reducing members lies adjacent to each cigarette during testing, said testing station being situated between the two drums.

3. A cigarette testing device according to claim 2 in which each pressure-reducing member forms part of an assembly which includes part of the fluted drum and which closely surrounds part of the cigarette at the testing station so as to reduce the flow of air through the part of the cigarette wrapper which is thus closely surrounded.

4. A cigarette testing device according to claim 2 in which the pressure differential is produced by means of suction in an annular chamber around the cigarette at the testing station, the annular chamber being defined by the two drums, and the suction being connected to each annular chamber at the testing station via a suction space in the second drum.

5. A cigarette testing device according to claim 4 in which each pressure-reducing member comprises a part which restricts free communication between the suction space and the annular space to a slot in the second drum in the region of the joint between the filter and the smokable part of the corresponding cigarette.

6. A method of testing filter-tipped cigarettes comprising the steps of producing a pressure differential between the inside and outside of the wrapper of each cigarette in turn to induce an air flow through the wrapper

4

to detect leaks in the wrapper, selectively varying the pressure differential along the length of the wrapper so that the pressure differential is greatest in the region of the joint between the filter and the smokable part of the cigarette and is relatively less in other regions, whereby variations in the rate of air flow through the wrapper caused by variations in the porosity of the wrapper are minimized.

7. Apparatus for testing filter-tipped cigarettes each comprising a filter portion joined to one end of a tobacco portion including a wrapper, the apparatus comprising:

- a. means for carrying the cigarettes successively through a testing station;
- b. means for forming an enclosure around each cigarette in turn while at the testing station, whereby an annular space is formed between the cigarette and the enclosure, the annular space extending over the joint between the tobacco and filter portions and also over at least part of the tobacco portion;
- c. means for producing a pressure differential between the annular space and the interior of the cigarette to induce an air flow to test for the presence of any leaks; and
- d. means for varying the pressure at different points along the annular space whereby the said pressure differential is greater in the region of the joint than it is in the region of the tobacco portion.

8. Apparatus according to claim 7, further comprising means defining a slot for feeding suction to the annular space, the said means for varying the pressure comprising means for restricting the flow of air into the slot from the part of the annular space which extends over the tobacco portion of the cigarette.

* * * * *

40

45

50

55

60

65

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,760,631

Dated September 25, 1973

Inventor(s) Eryk Stefan Doerman

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Priority data omitted. Should read:

--13624/70

Great Britain

March 20, 1970--

Signed and sealed this 4th day of June 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents