

[54] **APPARATUS FOR THE UNIFORM
ADDITION OF SOLUBLE MATERIALS
TO CIGARETTES**

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[58] Field of Search **131/133 R, 133 A,
131/134, 140 R; 128/215, 218 R, 218 A, 1;
141/284**

[56] **References Cited**

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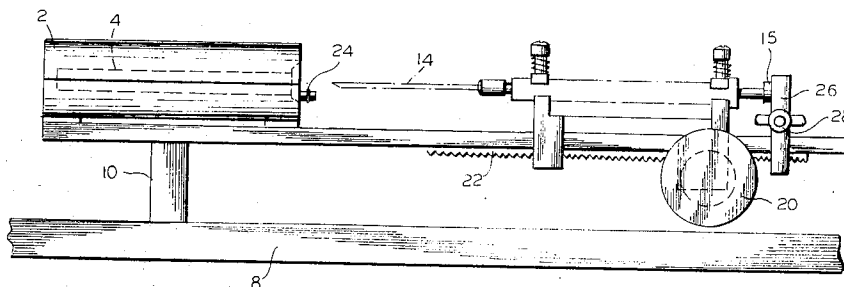
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[57] **ABSTRACT**

An apparatus for uniformly distributing an additive solution throughout the length of a cigarette. A hinged block with a recessed cavity or cradle means for holding a cigarette is immovably attached to one end of a track. A carriage provided with clamps for holding a syringe or additive reservoir having a needle and plunger is movably attached to the track in a position facing the hinged block. A stop means is provided to prevent rearward movement of the plunger after the carriage has been moved forward enough so that the syringe needle has penetrated the length of the cigarette and its tip is positioned at the end of the cigarette opposite that at which it entered.

3 Claims, 3 Drawing Figures



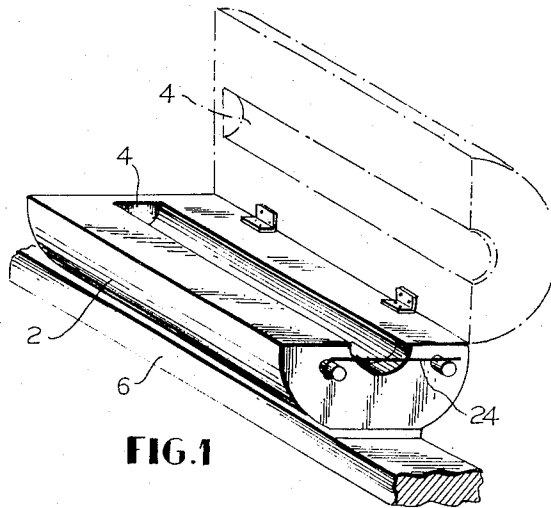


FIG. 1

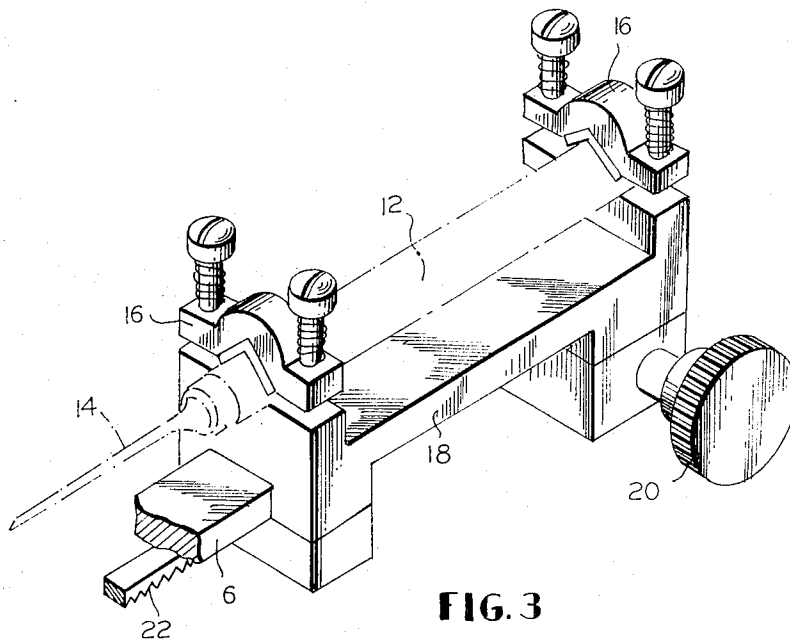


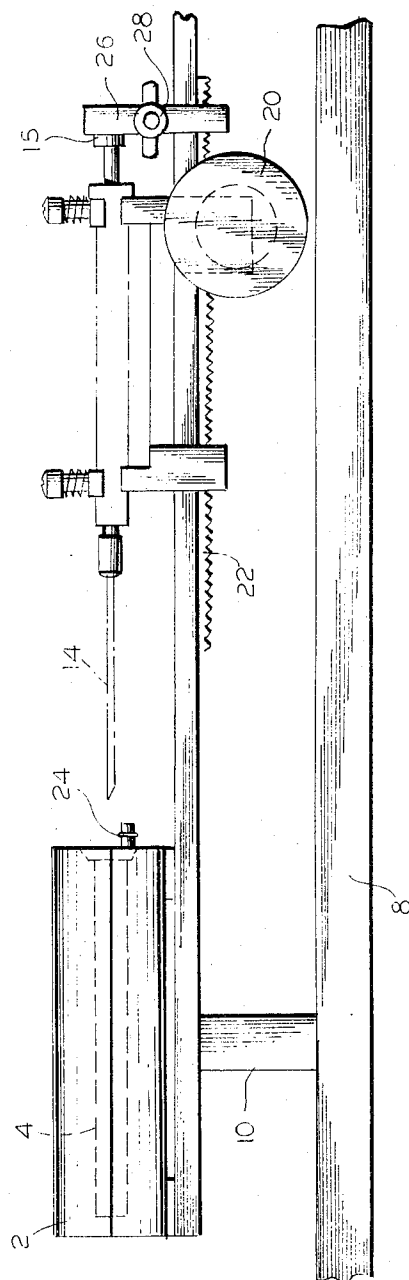
FIG. 3

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APPARATUS FOR THE UNIFORM ADDITION OF SOLUBLE MATERIALS TO CIGARETTES

A non-exclusive, irrevocable, royalty-free license in the invention herein described, throughout the world for all purposes of the United States Government, with the power to grant sub-licenses for such purposes, is hereby granted to the Government of the United States of America.

This invention relates to an apparatus for adding substances, especially substances soluble in suitable solvents, to cigarettes. More particularly, it relates to an apparatus for adding substances uniformly throughout the length of a cigarette.

It is known that certain additives affect or modify the composition of cigarette smoke. However, the modifications have not always been uniform for a number of reasons. For example, Terrell and Schmeltz, Tobacco Science 14, pp. 82-85, 1970, observed that some of the effects noted with some additives may have been due to such things as the way the additives were intermixed with the tobacco and the resulting orientation of tobacco fibers and additive within the cigarette rather than to the additive itself.

As previously reported (Beitrag Zur Tabakforschung, 4, 269, 1968), several methods have been used to make mixtures of tobacco and additives. The most frequently used method was to grind the additive, screen it through a 200 mesh sieve and mix it intimately with the tobacco in a small, flexible bag. Another method was to dissolve the additive in a solvent, spray the solution on the tobacco and remove the solvent by drying the mixture in an oven at 105° C. A third method was to spray a precursor of the desired additive on the tobacco and precipitate or hydrolyze the precursor to form the desired product in situ. Still another method was to inject with a syringe an appropriate volume of an aqueous solution of the additive. However these methods of preparing mixtures of tobacco and additive are not satisfactory mainly because of a lack of uniformity in the distribution of the additive throughout the cigarette. In fact, prior to the present invention, no apparatus was available which would insure that an additive was uniformly distributed throughout the length of the cigarette.

An object of this invention is to provide an apparatus for uniformly distributing an additive throughout the length of a cigarette.

Another object is to provide an apparatus for uniformly distributing an additive to a cigarette with a minimal disruption to the manner in which the tobacco is packed in the cigarette.

Still another object is to provide an apparatus which can be used to make up for research purposes small batches of cigarettes containing one or more additives.

According to the present invention the above objects are accomplished by an apparatus having a cradle means for holding a cigarette in a stationary position and a syringe with needle mounted on a carriage provided with rack and pinion for lateral movement over a track on which both the carriage and the cradle means are mounted. The carriage is moved forward until the syringe needle has penetrated the length of the cigarette in the cradle, a stop means on the track is moved to a position immediately adjacent to the plunger of the syringe and clamped in position so that the plunger cannot move rearward, and then the carriage with syringe and needle is moved rearward at an

even rate of speed to uniformly dispense the additive solution in the syringe throughout the length of the cigarette.

The invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a view of the cradle means, a longitudinally bisected hinged block provided with a recessed cavity.

FIG. 2 is a side view of the completely assembled apparatus.

FIG. 3 shows the syringe and needle mounted on the carriage provided with rack and pinion.

A longitudinally bisected hinged block 2 provided with a recessed cavity or cradle means in each half of the block is immovably mounted on one end of track 6 which is parallel to base member 8 and supported by a pair of legs 10, only one of which is shown in FIG. 2. Syringe 12 with needle 14 and plunger 15 is secured by clamps 16 to carriage 18, which moves freely forward and backward on track 6 by the action of pinion 20 on rack 22. Wire 24 attached to the front of hinged block 2 across the opening made by cradle 4 is provided to guide and center needle 14 into said cradle. Stop means 26 provided with clamp 28 is movable mounted on track 6 to limit the movement of syringe plunger 15.

In operation, a cigarette is placed in cradle 4, syringe 12 is the additive reservoir and is filled with a solution of the substance to be added to the cigarette and then clamped on to the carriage 18. Pinion 20 is turned to move carriage 18 forward until needle 14 has penetrated the length of the cigarette and the tip of the needle is positioned at the end of the cigarette opposite that at which is entered. Stop means 26 is then moved along track 6 and tightly clamped to the track in a position rearward and immediately adjacent to the end of the plunger 15 so that the plunger cannot move rearward. Syringe needle 14 is then gradually and at an even rate of speed withdrawn from the cigarette by turning pinion 20 to move carriage 18 and syringe 12 rearward. As syringe needle 14 moves rearward, plunger 15, which cannot move because of stop means 26, gradually and uniformly dispenses the solution containing an additive throughout the length of the cigarette.

I claim

1. An apparatus for uniformly distributing an additive solution throughout the length of a cigarette, comprising, in combination:

- a. a track provided with rack means;
- b. a stationary, longitudinally bisected hinged block mounted on one end of said track, said block having a tubular bore coaxial with the length of the block and designed to hold a cigarette in a stationary position;
- c. a carriage mounted on said track having means for cooperating with the rack means on the aforesaid track to move said carriage laterally on the track at a constant rate of speed, said carriage being mounted on said track in opposition to the aforesaid hinged block; and
- d. an additive reservoir having a needle and plunger mounted on the aforesaid carriage.

2. The apparatus of claim 1 wherein the hinged block is provided with a wire bisecting the opening of the tubular bore to guide and center the needle of the additive reservoir into a cigarette positioned therein.

3. The apparatus of claim 2 wherein a stop means is movably mounted on the track for limiting the rearward movement of the additive reservoir plunger.

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