

June 29, 1954

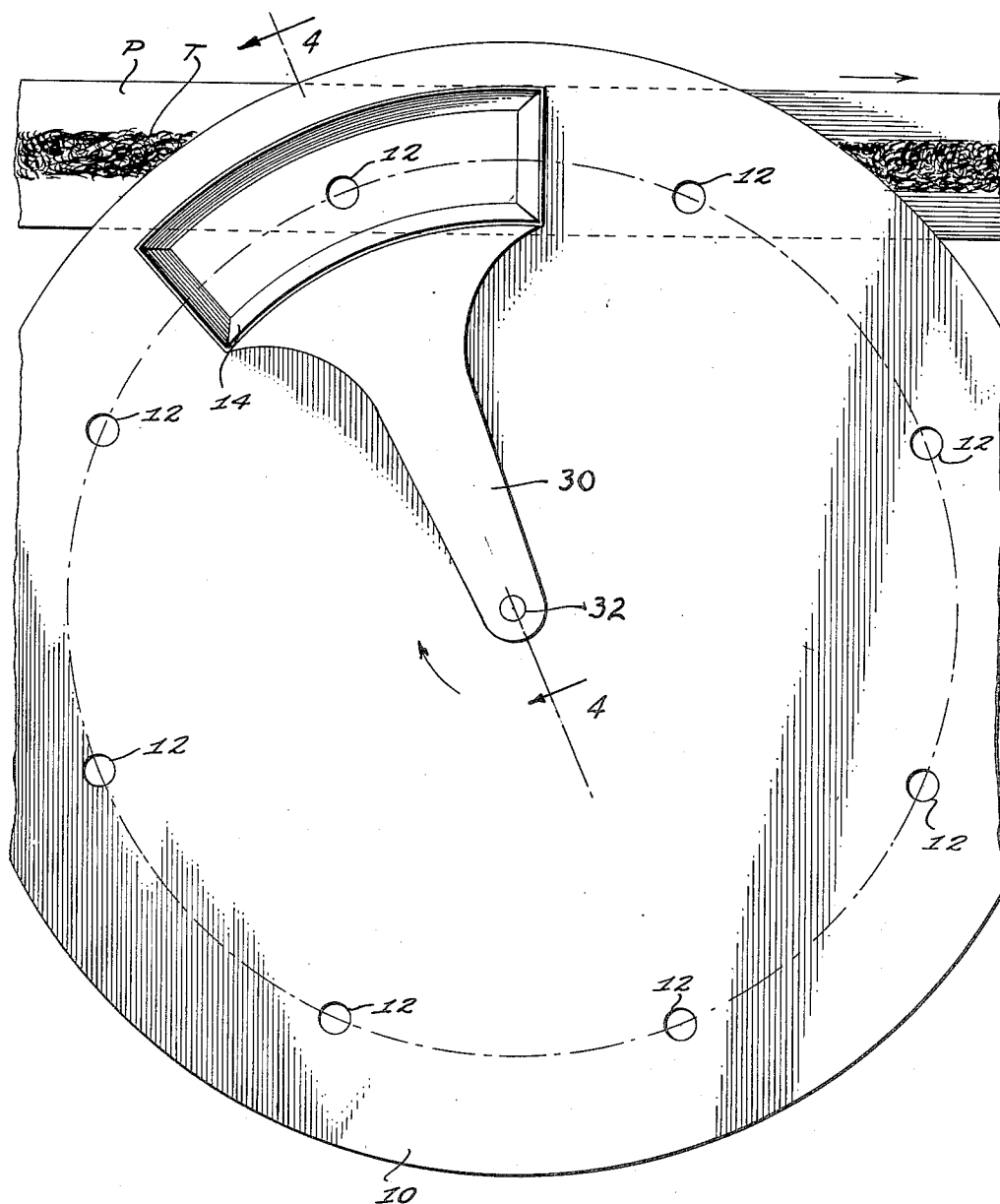
M. O. SCHUR
DOSING APPARATUS

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Fig. 1



INVENTOR.
MILTON O. SCHUR
BY
Parrott and Richards
ATTORNEYS

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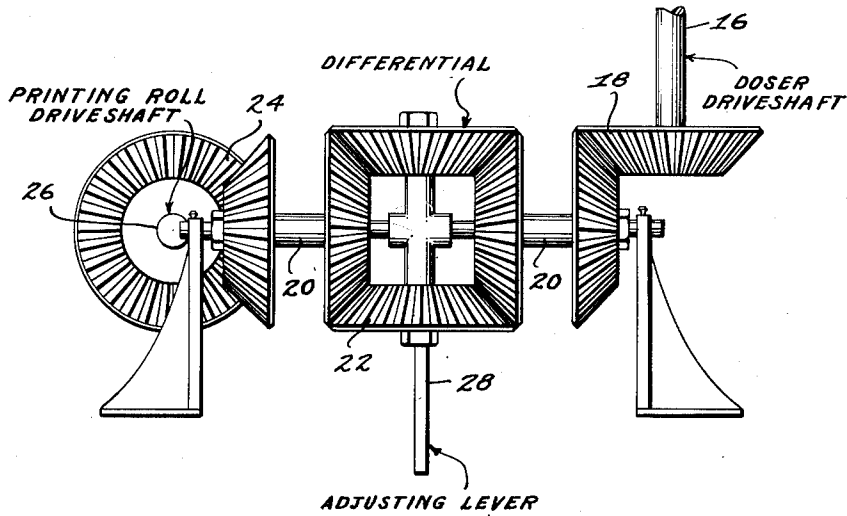


Fig. 2

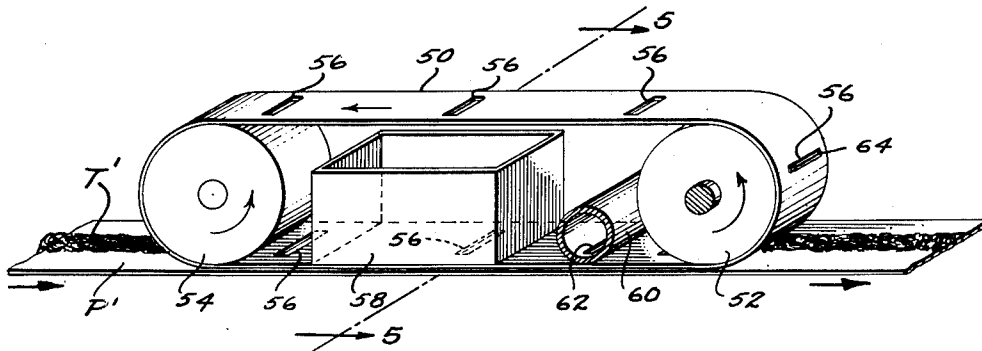


Fig. 3

INVENTOR.
MILTON O. SCHUR

BY
Parrott and Richards
ATTORNEYS

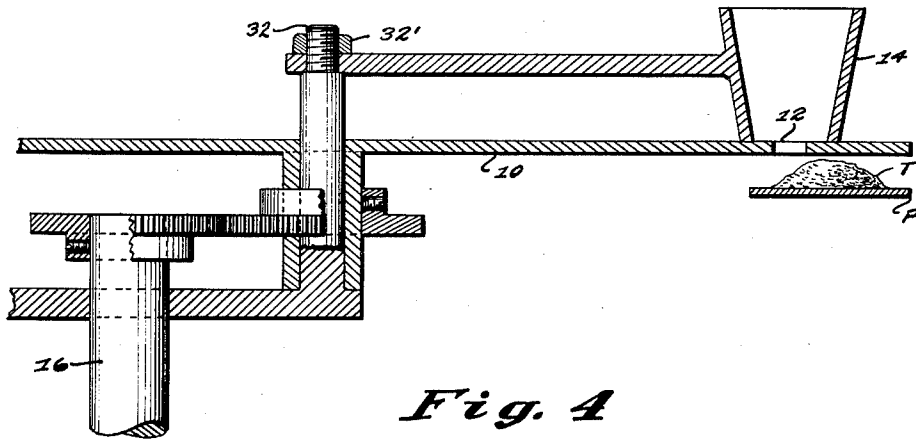
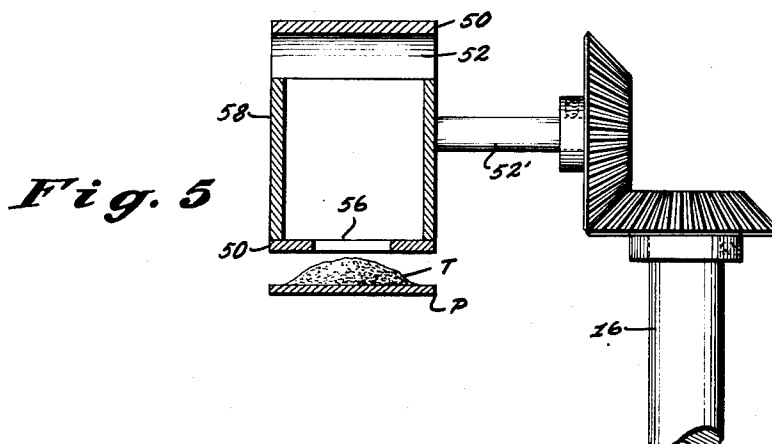
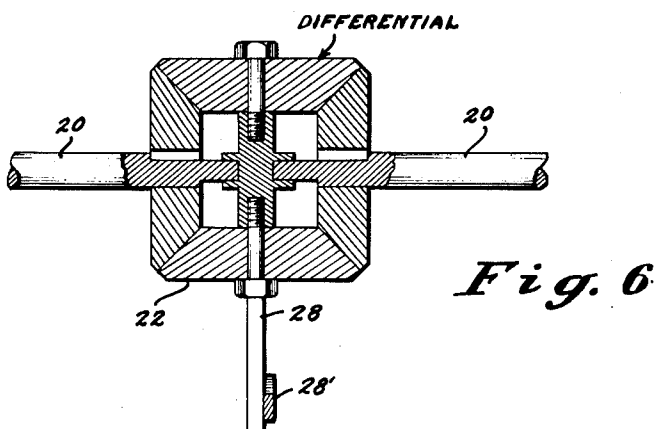
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MILTON O. SCHUR
BY
Parrott & Richards
ATTORNEYS

UNITED STATES PATENT OFFICE

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DOSING APPARATUS

Milton O. Schur, Asheville, N. C., assignor to
Ecusta Paper Corporation, a corporation of
Delaware

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5 Claims. (Cl. 131-61)

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This invention relates generally to apparatus for dosing a linearly traveling body of material at spaced intervals with a modifying ingredient, and more particularly to an apparatus of this sort adapted for use in a cigarette making machine for dosing or adding the modifying ingredient at regularly spaced intervals to the traveling mat of tobacco as it is carried on the cigarette paper before folding.

A specific example of a use for which the dosing apparatus of the present invention is especially well adapted is the addition of a powdery fireproofing agent, such as borax, to cigarettes during their manufacture to render the cigarette self-extinguishing, and for convenience the present invention will be described in relation to an embodiment constructed and arranged for this purpose.

In the accompanying drawing:

Fig. 1 is a diagrammatic plan view illustrating the general arrangement of a dosing apparatus constructed in accordance with the present invention for use on a cigarette making machine;

Fig. 2 is a diagrammatic illustration of driving means incorporating differential gearing for synchronizing operations of the dosing apparatus shown in Fig. 1 with operation of a cigarette making machine;

Fig. 3 is a diagrammatic perspective detail of a modified embodiment of the dosing apparatus of the present invention;

Fig. 4 is a sectional detail taken substantially on the line 4-4 in Fig. 1;

Fig. 5 is a sectional detail taken substantially on the line 5-5 in Fig. 3; and

Fig. 6 is a vertical sectional detail of the differential shown in Fig. 2.

Referring now in detail to the drawings, and more particularly at first to Fig. 1, the dosing apparatus of the present invention comprises a circular plate member 10 which is mounted for rotation in a horizontal plane with its peripheral portion disposed over the linearly traveling body of material to be dosed, such as a mat of tobacco as carried on the cigarette paper which is indicated generally in Fig. 1 at P.

The circular plate member 10 is formed with an annular series of apertures adjacent its periphery as at 12, and these apertures 12 are serially spaced in correspondence with the spacing desired for the dosing. That is, for example, the apertures 12 are arranged with a spacing equivalent to the length of the cigarette being manufactured, where it is desired to apply one dose of the modifying ingredient to each cigarette.

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The apertures 12 are further located so that the circular path which they follow upon rotation of the plate member 10 is tangent to the linear path of the central portion of the traveling mat of tobacco T carried on the cigarette paper strip P.

A stationary open bottom hopper member 14 is mounted for adjustment about a pin 32, as explained further below, and is disposed in superposed relation to the plate member 10 above the annular series of apertures 12 and over the traveling mat of tobacco T carried on the paper strip P, as shown in Fig. 1. The base of the hopper member 14 lies above the circular path of the apertures 12 in a length not exceeding the spacing of the apertures 12.

In operation the modifying ingredient is fed into the hopper member 14 at any suitable predetermined rate, and as each aperture 12 in the plate member 10 passes beneath the hopper member 14 upon rotation of the plate member 10, the modifying ingredient feeds through the aperture 12 onto the linearly traveling material below the plate member 10. It will be seen that, as the open bottom of the hopper member 14 is otherwise closed by the plate member 10, the feeding through each aperture 12 continues only as long as the aperture is traveling beneath the hopper member 14 and over the linearly traveling material, and that the spaced arrangement of the apertures 12 will cause this feeding or dosing to occur at spaced points on the linearly traveling material as the apertures 12 are rotated successively below the hopper member 14.

In addition, means are provided according to the present invention for rotating the plate member 10 at a speed which results in a lineal rate of travel for the apertures 12 equal to the lineal rate of travel of the material being dosed, so that the dosing through each aperture 12 takes place at a particular point. Preferably this means also incorporates differential gearing or the like for synchronizing rotation of the plate member 10 with operation of the cigarette making machine, or other equipment used for handling the linearly traveling material.

Suitable means for rotating and synchronizing the plate member 10 in relation to a cigarette making machine is illustrated in Fig. 2 of the drawing, in which a drive shaft for the plate member 10 is indicated at 16 as being arranged for driving through a conventional registration means comprising a set of miter gears 18 from a drive shaft 20 that is fitted with a differential 22 and driven from a set of miter gears at 24

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forming a driving connection off of an operating element of the cigarette making machine, such as the printing roll shaft as at 23. Any other similar operating shaft such as the cut-off knife shaft might be alternately used if desired. The differential 22 fitted on the drive shaft 29 as shown in Fig. 6 incorporates a rotatable housing which may be adjusted as by a lever 28, the adjustment being in a plane perpendicular to the plane of the drawing as seen in Fig. 6, and the lever 28 normally being held at an adjusted position by a suitable quadrant means such as is indicated at 28' in Fig. 6. By this arrangement the phase relationship of the rotation of plate member 10 to the operation of the cigarette making machine may be synchronized as desired.

It should also be noted that the supporting arm 30 for the hopper member 14 is pivoted on a pin or the like as at 32, the axis of which coincides with the center of the circular plate member 10, and which may be fitted with a lock nut or similar means 32' (see Fig. 4) for maintaining the supporting arm 30 at a desired pivoted position relative to the center line of the strip of cigarette paper P. This arrangement makes it possible to adjust the position of the hopper member 14 and thereby compensate for the time taken, however short, for the modifying ingredient to fall through the apertures 12 and reach the traveling mat of tobacco T or other material being dosed. This is a particularly advantageous feature because the apertures 12 may travel an appreciable distance during the time of fall of the modifying ingredient, especially in the case of modern high-speed cigarette making machines, and it is accordingly highly important to provide for effective adjustment of the dosing apparatus when used in high speed operation of this sort.

Fig. 3 of the drawing illustrates a modified embodiment of the dosing apparatus of the present invention in which a continuous belt 50 is used as the dispensing member, rather than a circular plate 10 as in the previous embodiment just described above. This continuous belt 50 preferably comprises a thin metal belt formed of steel or other suitable material, which may be trained with at least its lower reach disposed for movement in a horizontal plane, as by pulleys 52 and 54. The belt member 50 is disposed in this manner by the pulleys 52 and 54 with its lower reach positioned parallel to and just above the linearly traveling material to be dosed, such as a mat of tobacco T' being carried in a cigarette making machine on a strip of cigarette paper as at P' in Fig. 3.

The belt member 50, similarly to the previously described circular plate member 10, is formed with an aligned series of apertures 56 which are preferably formed as transverse slots so that the modifying ingredient may be distributed as fully as possible across the width of the traveling mat of tobacco T' at each spaced interval. The apertures 56 are spaced in the belt member 50 in a linear series adjacent the central portion of the belt member 50 and for its entire continuous length. Also, as before, the apertures 56 are serially spaced in correspondence with the spacing desired in dosing the linearly traveling material, although the belt member 50 is arranged so that the linear path of the apertures 56 is coincident with the linear path of the central portion of the material to be dosed.

The stationary open bottom hopper member 58 used in this case is fixed to be superposed above the lower reach of the belt member 50 above

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the series of apertures 56 and over the traveling mat of tobacco T' carried by the cigarette paper strip P'. The hopper member 58, as in the case of the Fig. 1 embodiment, has the open bottom thereof closed by the belt member 50 except for the apertures 56, and extends in the path of the apertures 56 in a length not exceeding the spacing of the apertures 56, so that each aperture 56 as it passes beneath the hopper member 58 allows a dose of the modifying ingredient to fall from the hopper 58 onto the traveling mat of tobacco below.

The right-hand pulley member 52 as seen in Fig. 3 is preferably the driving pulley (the drive shaft therefor being indicated at 52' in Figs. 3 and 5), although the other pulley member 54, or both, may be driven if desired. Means such as is illustrated in Fig. 2 and described above may be employed for synchronizing the movement of the belt member 50 with the traveling mat of tobacco and for driving them at equal linear speeds, so that dosing of the modifying ingredient will occur at the desired spaced intervals.

Beyond the hopper member 58 a suction pipe 60 may be arranged to rest on the lower reach of the belt member 50 so as to keep the belt free of any particles of the modifying ingredient which may escape the doctoring or wiping action of the edge of the hopper member 58. As illustrated in Fig. 3, the suction pipe 60 is formed with a slot 62 disposed to act on the upper surface of the belt member 50 just beyond the hopper member 58 and thereby carry off any escaping particles of the modifying ingredient so that they cannot be carried on between the belt and pulleys to be crushed and cake on the pulley surfaces and thereby cause difficulties in operation of the dosing apparatus.

To prevent slippage between the belt member 50 and the driving pulley 52, the face of this pulley is formed with bosses or projections 64 which are spaced for meshing with the apertures 56 in the belt member 50 and thereby act as gear teeth, so to speak, in maintaining a positive driving relation between the belt member 50 and the driving pulley 52.

This last described embodiment of the dosing apparatus of the present invention has the advantage of arranging the dispensing member (i. e., the belt member 50) for travel in a direction truly parallel to the linear path of the material to be dosed throughout the entire time that any one aperture 56 is delivering a dose of modifying ingredient to the linearly traveling material, which arrangement avoids the necessity for adjusting the mechanism to allow for the time of fall of the modifying ingredient onto the material to be dosed, and thereby renders this embodiment more adaptable in this respect for use in very high-speed production equipment, such as modern cigarette making machines.

I claim:

1. An apparatus of the character described for dosing a linearly traveling body of material at regularly spaced intervals with a powdery modifying ingredient, said apparatus comprising a dispensing member presenting a plane surface for movement in a horizontal plane, said dispensing member being formed with an aligned series of apertures in said plane surface and with said apertures serially spaced in correspondence with the spacing desired for said dosing, and said dispensing member being disposed to present said plane surface above and spaced from said traveling body of material with the path of said

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series of apertures at one point being directly above the plane of the longitudinal axis of the linearly traveling body of material, a stationary, open bottom, hopper member in superposed relation with the plane surface of the dispensing member and having the bottom thereof closed, except for said apertures, by the plane surface presented by said dispensing member, said hopper member extending over the path of said apertures in a length greater than the aperture width dimension in said path but not exceeding the spacing of said apertures, and means for moving the plane surface presented by said dispensing member at a speed whereby the lineal rate of travel of said apertures equals the lineal rate of travel of said material.

2. In a cigarette making machine, an apparatus for dosing a linearly traveling mat of tobacco, as carried on the cigarette paper before folding, with a powdery modifying ingredient at regularly spaced intervals, said apparatus comprising a continuous belt member trained with at least its lower reach disposed for movement in a horizontal plane over said traveling mat of tobacco, said belt member being formed with an aligned series of apertures spaced in a linear series adjacent its longitudinal axis and for its entire continuous length, said apertures being serially spaced in correspondence with the spacing desired for said dosing and being located with their linear path coincident with the vertically projected linear path of the central portion of said material, a stationary, open bottom, hopper member superposed above the belt member and having the bottom thereof closed, except for said apertures, by the lower reach of said belt member, said hopper member extending above the path of said apertures over a distance greater than the aperture width in said path but not exceeding the spacing of said apertures, and means including pulley members for driving said belt member at a speed whereby the lineal rate of travel of said apertures equals the lineal rate of travel of said mat of tobacco.

3. In a cigarette making machine, an apparatus as defined in claim 2 and further characterized in that said apertures are formed as transverse slots in said belt member, said pulley members having spaced projections thereon, and said belt member is trained over said pulley members, said pulley members having the faces thereof formed

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with said projections spaced for meshing with said apertures.

4. In a cigarette making machine, an apparatus for dosing a linearly traveling mat of tobacco, as carried on the cigarette paper before folding, with a powdery modifying ingredient at regularly spaced intervals, said apparatus comprising a circular plate member mounted for rotation in a horizontal plane, said plate member being formed with an annular series of apertures adjacent its periphery and with said apertures serially spaced in correspondence with the spacing desired for said dosing, and said plate member being disposed with the peripheral portion thereof located for rotation above and spaced from said traveling mat of tobacco with the circular path of said apertures tangent to the vertically projected linear path of the traveling mat of tobacco along its longitudinal axis, a stationary, open bottom, hopper member superposed above said plate member and having the bottom thereof closed, except for said apertures, by said plate member, said hopper member extending over the circular path of said apertures in an arcuate length greater than the corresponding direction aperture dimension in said path but not exceeding the spacing of said apertures, and means for rotating said plate member at a speed whereby the lineal rate of travel of said apertures equals the lineal rate of travel of said mat of tobacco.

5. In a cigarette making machine, an apparatus as defined in claim 4 and further characterized in that said hopper member is mounted adjustably in superposed relation to said circular plate member by a pivot support having an axis coincident with the center of said circular plate member and incorporates locking means for maintaining said hopper member at an adjusted position.

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