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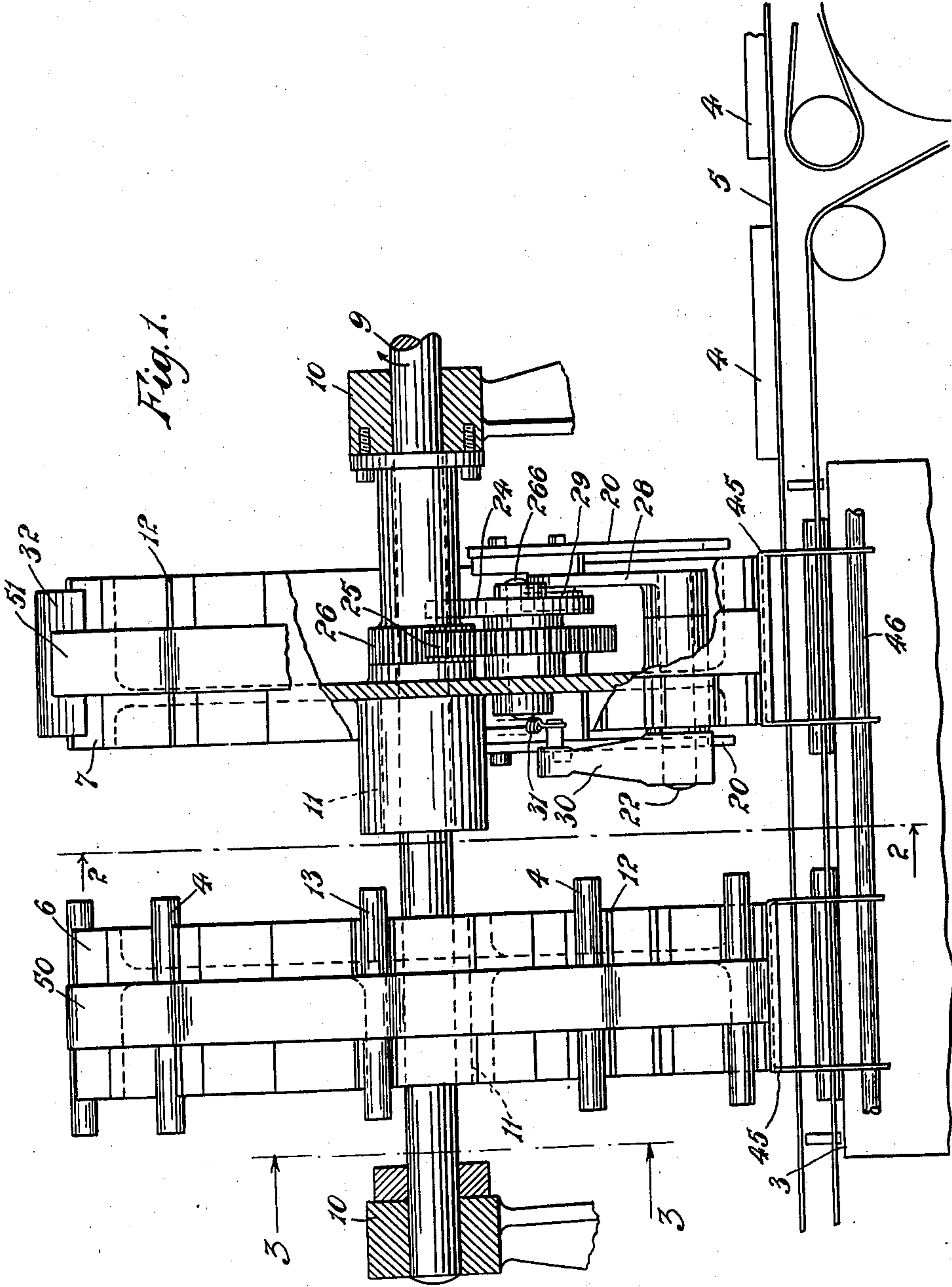
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2,183,664

CONVEYANCE OF CIGARETTES

Filed May 31, 1938

4 Sheets-Sheet 1



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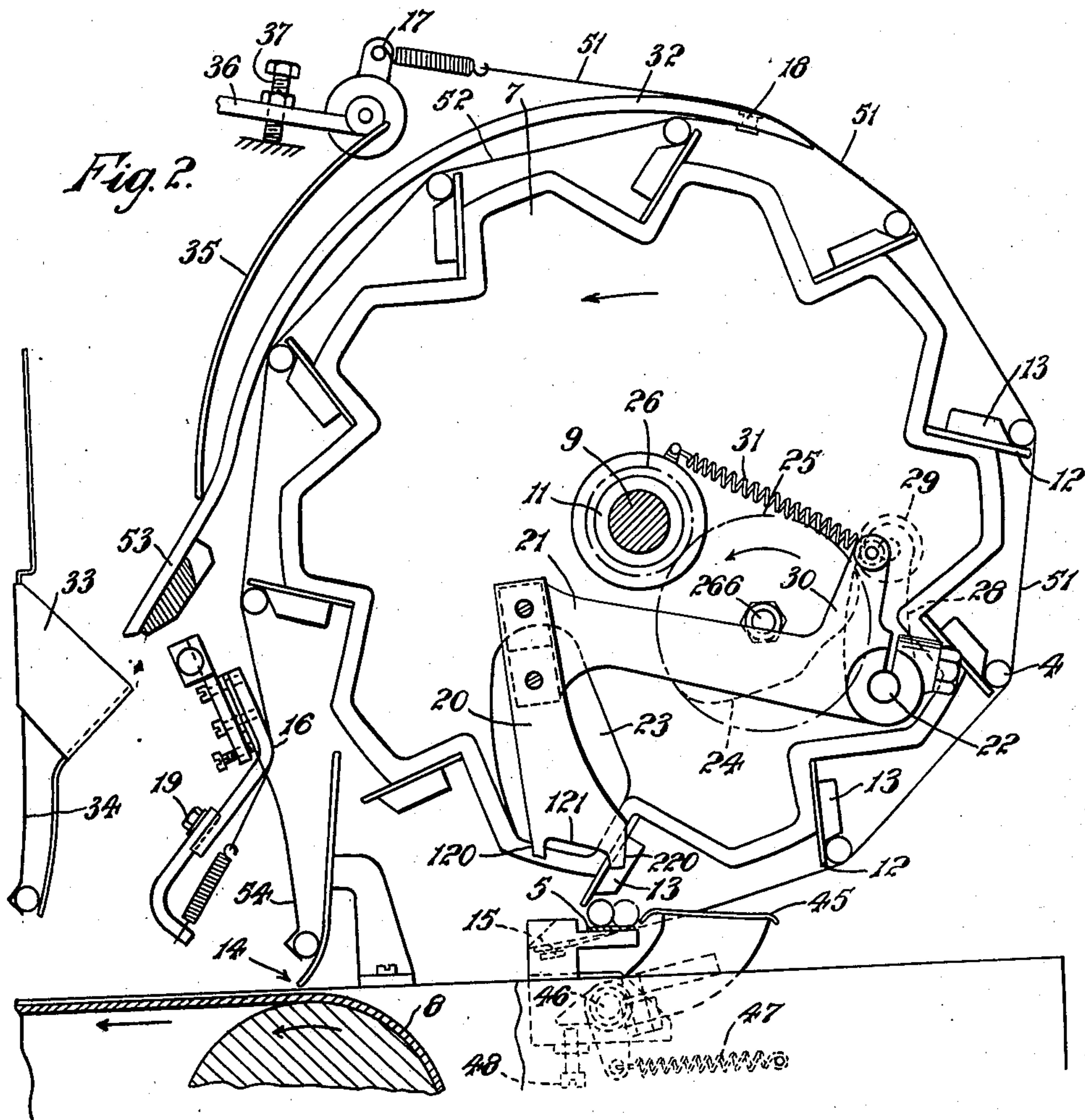
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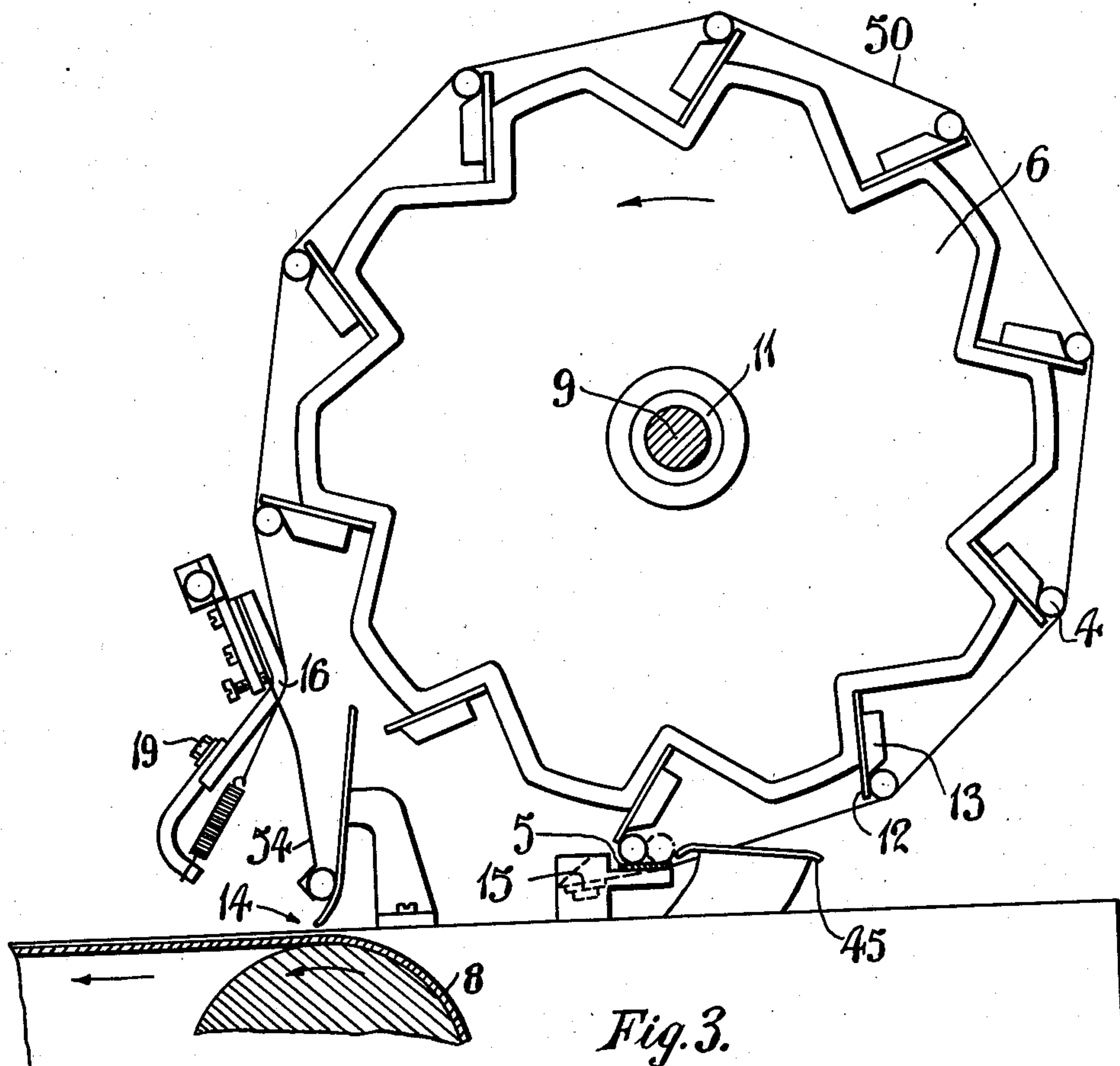
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CONVEYANCE OF CIGARETTES

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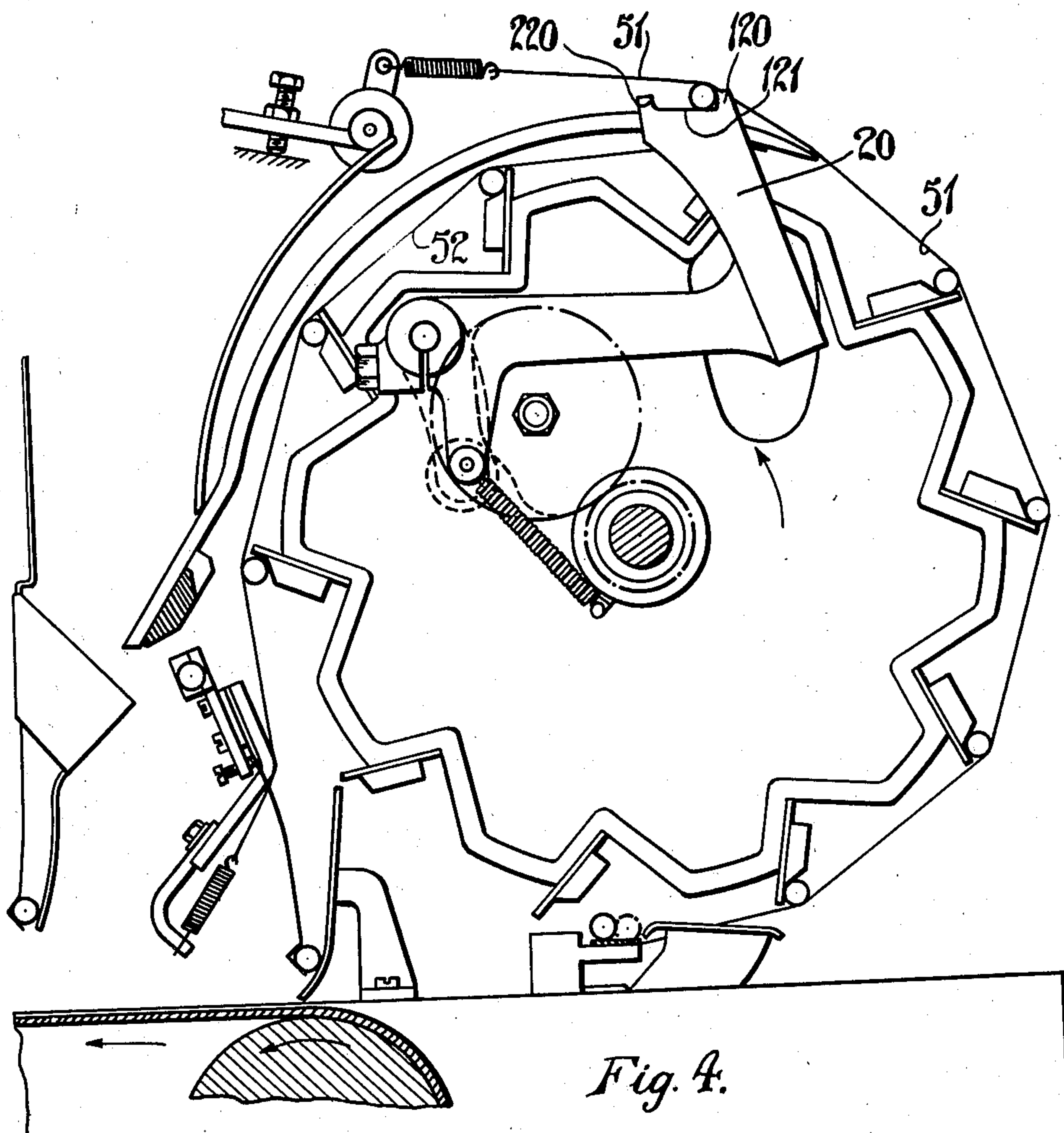
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CONVEYANCE OF CIGARETTES

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

CONVEYANCE OF CIGARETTES

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Application May 31, 1938, Serial No. 210,977

In Great Britain June 30, 1937

5 Claims. (Cl. 131-25)

This invention is for improvements in or relating to the conveyance of cigarettes.

In the manufacture of cigarettes it is often desired to convey cigarettes from a source of supply to a mechanism for testing or weighing or otherwise acting on the products. Cigarettes are sometimes taken at regular intervals from a continuous rod cigarette making machine and these selected cigarettes are conveyed to a weighing or testing device. When cigarettes are so selected from continuous rod cigarette machines the cigarettes after being cut from the rod are usually conveyed laterally from the rod line and deposited on to a conveyor moving at right angles thereto and known as the "catcher band". This lateral conveyance is usually effected by vanes or blades rotatable about an axis which is parallel with the axis of the continuous cigarette rod. When such a conveying device is used the blades generally move the cigarettes laterally for an inch or so, and then permit the cigarettes to fall on to the catcher band; but where it is desired to abstract some or all of the cigarettes for weighing, testing or otherwise treating them, it is found convenient to move all of the cigarettes upwardly through a substantially circular path before depositing the cigarettes on to the band.

When only some of the cigarettes produced by the machine are to be treated, those cigarettes which are to be treated are preferably selected during their movement through the circular path, as there is usually plenty of room and time for the devices necessary for this purpose to operate during such movement.

It is an object of the invention to provide a flexible shroud which cooperates with a conveyor moving cigarettes in succession through a curved path, the shroud being so tensioned that as the cigarettes are moved beneath the shroud the latter conforms substantially to the shape of the part of the cigarette engaging the shroud thereby holding the cigarette in position against the conveyor.

A further object is to provide two flexible shrouds each of which partly encircles the path of the conveyor, a guide being disposed between the shrouds and a selector being movable in timed relationship with the conveyor and operative to move a cigarette out of the path of the conveyor and over said guide so that the selected cigarette is delivered to a testing device such as a weighing device.

The term "blade" where used in the appended claims is deemed to mean a single element to engage a cigarette or a pair of elements on a set

of elements the effect of which is to act as a conveyor piece to engage the cigarette and move it laterally.

The invention is applicable to any device for conveying cigarettes from a supply to a testing or other device whether mounted on a cigarette making machine or not. One example of apparatus made in accordance with the present invention will now be described with reference to the accompanying drawings, the construction shown in the example being employed for removing cigarettes from a supply made by and issuing from a continuous rod cigarette making machine.

In the drawings:

Figure 1 is a front elevation of an apparatus constructed according to the invention.

Figure 2 is a section of Figure 1 on line 2-2.

Figure 3 is a section of Figure 1 on the line 3-3.

Figure 4 is a view similar to that shown in Figure 2 but with certain parts shown in different positions.

Like reference numerals refer to like parts throughout the specification and drawings.

Referring to the drawings, the cigarettes 4 are conveyed in a line by the tape 5 from the cutting apparatus of the continuous rod cigarette making machine, and two consecutive cigarettes are brought into position in line with conveyors shown as carriers 6, 7 and are then deflected laterally out of the rod line on to the catcher band 8. The carriers 6, 7 are mounted on a spindle 9 carried in bearings 10 fixed to the bed of the machine, the axis of rotation of the spindle 9 being parallel to the axis of the continuous cigarette rod. In practice, the carriers are driven through clutch members which slip in the event of a jam, but these are omitted from the drawings as they form no part of the present invention. It is for this reason that the drums are furnished with bushes 11.

Each carrier is of substantially circular form, but is stepped as shown in Figure 2 to provide facings to which blades 12 may be secured. Each blade 12 is provided with an abutment 13, the parts being disposed as shown in Figure 2 so that the abutment is arranged at a distance from the edge or extremity of a blade which is less than the diameter of a cigarette, and a blade together with its abutment forms a recess in which the cigarette can rest. As will be seen from Figure 2 the surface of the blade 12 and the surface of the abutment 13 which engages with a cigarette are in non-parallel planes and adjoin each other.

The carriers rotate in the direction of the arrow shown in Figure 2, so that the cigarettes are laterally removed from the tape 5 and are conveyed upwardly through a substantially circular path as shown in Figure 2 and are delivered, if they are not passed to a weighing device referred to below, on to the catcher band at the point 14. Thin flexible bands or strips 50, 51 and 52 made of spring steel, the surfaces of which are smooth, are provided to retain the cigarettes in their recesses as they are moved by the carriers 6 and 7 respectively through the circular paths. Spring steel strips or bands whose thickness is .002" have in practice been found to give satisfactory results.

As shown in the drawings, the carrier 6 is not furnished with a selecting device to pass cigarettes to a device for further treatment, but all of the cigarettes moved by the blades on the carrier 6 are delivered directly on to the catcher band 8; the flexible band 50 is therefore arranged to stretch from the position 15 around the edges or extremities of the blades 12 to the position 16 (see Figure 3).

With regard to the carrier 7, the band 51 stretches from the position 15 around the blades 12 and is then taken to an anchorage 17. The band 52 stretches from the position 18 to the position 13 and forms in effect a continuation of the band 51. Each band is rigidly anchored at one end, for example, at the positions 15 and 18 respectively, which positions are adjacent to those parts of the bands which are first engaged by a cigarette. The opposite ends of the bands are connected to their anchorages by springs so that the bands, quite apart from their inherent flexibility, are under spring tension which permits adjustment of the extent to which the bands can flex. In the case of the anchorage at 16 the band 52 is adjusted by the sliding member 19 and in the case of the anchorage at 17 the band 51 is adjusted by a screw (not shown).

The bands 50, 51 and 52 which are made of thin spring steel are strong and yet flexible and under the tension of the springs shown the bands are caused to take up the polygonal shape shown in Figure 2 when the carriers are at rest, although of course as the carriers rotate the points of the polygon will move round with the blades 12. The bands will, however, when engaged by a cigarette which is engaged for movement by one of the blades, conform substantially to the shape of that part of the cigarette which is engaged by the band, that is to say, the band is so flexible due to its thinness that it engages simultaneously with several successive lines on the surface of the cigarette and does not merely make a line contact therewith. This can clearly be seen from Figure 2. Since the flexible bands normally engage the edges or extremities of the blades 12, and due to the arrangement whereby the depth of a recess is less than the diameter of a cigarette, when a cigarette is present in a recess, the flexible band is moved away from the edge or extremity of the blade and as seen in Figure 2, conforms partly to the configuration of the cigarette engaged thereby, thus causing the cigarette to be pressed into the recess and to be held against the surface of the blade and the adjoining surface of the projection 13. Due to the smooth nature of the flexible bands the cigarette is caused to slide over the surface thereof whilst being moved by a blade and the cigarette is, therefore, prevented from partaking of any substantial movement relatively to the blade and to the pro-

jection against which elements it is held by the flexible band.

The selector which determines which of the cigarettes being moved by the blades 12 shall be subjected to further treatment comprises a slotted fork member 20 at each side of the carrier 7, the members being fixed to an arm 21 pivoted at 22 in the web of the carrier 7. The forks 20 thus form two narrow cheeks at each side of the carrier and are movable in timed relationship therewith and consequently in timed relationship with the blades 12. As described below, relative movement between the forks and the carrier is effected in order to move the selected cigarette out of the path through which it is being moved by a blade 12 and to deliver it to a weighing device (not shown). The end of the arm 21 to which the forks 20 are fixed projects through a hole 23 in the web of the carrier 7 so that the forks 20 may be attached to it. The arm 21 is operated by a cam 24 which is secured to a gear wheel 25 mounted on a spindle 26 fixed to the web of the carrier and the gear 25 engages with a fixed pinion 26 which is half the diameter of the gear 25 so that during rotation of the carrier the cam 24 is turned through half a revolution. The pinion 26 is formed with a sleeve which is fixed to the bearing 10, Figure 1. The spindle 22 carries on the other side of the web of the carrier an arm 28 furnished with a roller 29 which engages the cam 24, and the arm 21 has an extension 30 to which one end of a spring 31 is anchored. The attachment of the arm 21 to the pivot spindle at 22 is in the form of a clamp as shown in order that the position of the fork relatively to the cam roller arm 28 may be adjusted, if desired.

The mechanism described thus causes the forks 20 to be moved outwards as shown in Figure 4 away from the axis of rotation of the carrier once in every two revolutions and as there are ten blades arranged on a carrier this means that one cigarette in twenty conveyed by the carrier 7 is selected for weighing. As the carrier 6 delivers all its cigarettes to the catcher band 8 it will be seen that from the production of the machine one cigarette in every forty is selected for the weighing operation. The fork 20 in the position shown in Figure 2 is about to move outwards and the fork 20 moves the cigarette through the open space between the bands 51 and 52, which space forms in effect an interruption of the band 51 and out of the path of the blades 12. The fork then carries the cigarette over a curved plate 32 fixed at 53 to the machine frame. The selectors comprising the forks 20 are provided with two projections 120, 220 spaced apart one from the other in the direction of movement of the selector and, as a cigarette is moved out of the path of the blades 12 by the surface 121 of the fork which connects the two projections, the projections 120 engage the cigarette. The band 51 is arranged so that the distance between the surface 121 and the band is less than the diameter of a cigarette and the band 51 therefore retains the cigarette against the projections 120. This control of the cigarette, however, ceases before the cigarette is engaged by a pivoted guide 35 described below, but forward movement of the cigarette relatively to the selector 20 is restricted by the projections 220.

The forks continue to move the cigarette over the surface of the plate 32 until it reaches the free end of the guide 35 when the forks are

retracted and the cigarette permitted to roll from the plate 32 into a scale pan 33 connected with the weighing device (not shown). As the cigarette is passed beneath the guide 35 it is engaged thereby and its movement is retarded until it is again engaged by the projections 120 after which, until the cigarette reaches the free end of the guide 35, it is retained thereby against the projections 120. The scale pan is of the kind described in United States Letters Patent No. 2,091,516, and has one side wall consisting of a weak spring element 34 which is just strong enough to grip one cigarette in the position shown. The next oncoming cigarette will open the element 34 and permit the cigarette shown to be discharged on to the catcher band 8.

During the interval between the arrival of successive cigarettes in the pan 33, weighing and recording of the cigarette in the pan takes place.

The weighing device with which the pan 33 is connected may be of the same general construction as that shown in United States Letters Patent No. 2,091,516, in that the device may be arranged to weigh the cigarettes and record on several different counters the number of cigarettes of different specified weights there are among those selected for weighing.

To arrest the axial flight of the cigarettes before they are engaged by the thin bands, arresting means are provided to co-operate with the blades 12. The arresting means, as shown in Figure 2, comprises a plate 45 pivoted at 46 around which pivot it is urged in a counter-clockwise direction by a spring 47, the position of rest being regulated by an adjusting screw 48. The parts of the apparatus are so disposed and timed that a blade 12 moves a cigarette laterally against the plate 45, and the members 12 and 45, together with the abutment 13, form a light friction gripper. The friction is sufficient to arrest the axial movement of the cigarette, and further movement of the blade 12 causes the cigarette to depress the plate 45 by rotating it around the pivot 46 as the cigarette passes over it. The arrangement of the bands 50 and 51 is such that as or just after the friction grip between a blade 12 and a plate 45 releases a cigarette, the cigarette is engaged by a flexible band and is thereby held in position against the abutment 13 in the manner described above.

The cigarettes which are carried round by the carrier 6, as well as those on the carrier 7, which are not selected for weighing, are discharged into a chute 54 which is constructed in the same manner as the discharge chute of the pan 33. This allows each cigarette to fall gently on to the band 8. If desired, a piece of fabric may be substituted for the spring member of the chute 54.

A small latch or the like may be fitted to hold the forks 20 in the inoperative position when it is not desired to select any of the cigarettes for further treatment.

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

1. In apparatus for conveying cigarettes through a curved path, a conveyor comprising two adjoining surfaces disposed in non-parallel planes, a thin smooth flexible band which partly encircles the path of the conveyor and relatively to which a cigarette engaged by the conveyor is movable, a rigid anchorage for that end of the band which is adjacent the part thereof which is first engaged by a cigarette, and an adjustable anchorage connected with the opposite end of

the band to tension the band in the direction of movement of the conveyor to an extent such that movement of a cigarette into engagement with the band by the conveyor causes the band to yield and to retain the cigarette against said surfaces of the conveyor so that movement of the cigarette relatively to the conveyor is substantially avoided.

2. In apparatus for conveying cigarettes through a curved path, a conveyor comprising two adjoining surfaces disposed in non-parallel planes, a thin smooth flexible band which partly encircles the path of the conveyor and relatively to which a cigarette engaged by the conveyor is movable, a rigid anchorage for that end of the band which is adjacent the part thereof which is first engaged by a cigarette, an adjustable resilient anchorage for the opposite end of the band to tension the band in the direction of movement of the conveyor to an extent such that movement of a cigarette into engagement with the band by the conveyor causes the band to yield and to retain the cigarette against said surfaces of the conveyor so that movement of the cigarette relatively to the conveyor is substantially avoided.

3. In apparatus for conveying cigarettes through a curved path, means to move a succession of cigarettes in substantial axial alignment, a conveyor revolvable about an axis parallel to the axes of the axially aligned cigarettes, a blade connected with the conveyor to move a cigarette laterally from said succession of cigarettes, an abutment on said blade having a cigarette engaging surface arranged at a distance from the outer edge of the blade which is less than the diameter of a cigarette, a thin smooth flexible band which partly encircles the path of the conveyor and relatively to which a cigarette engaged by the conveyor is movable, a rigid anchorage for that end of the band which is adjacent the part thereof which is first engaged by a cigarette, an adjustable resilient anchorage for the opposite end of the band to tension the band in the direction of movement of the conveyor to an extent such that movement of a cigarette into engagement with the band by the conveyor causes the band to yield and to retain the cigarette against said surfaces of the conveyor so that movement of the cigarette relatively to the conveyor is substantially avoided.

4. In apparatus for conveying cigarettes through a curved path, a conveyor comprising two adjacent surfaces disposed in non-parallel planes, a pair of thin flexible bands each of which partly encircles the path of the conveyor and relatively to which a cigarette engaged by the conveyor is movable, an anchorage connected with opposed ends of each of the bands to tension the bands in the direction of movement of the conveyor to an extent such that movement of a cigarette into engagement with the bands by the conveyor causes the bands to yield and to retain the cigarette against said surfaces of the conveyor so that movement of the cigarette relatively to the conveyor is substantially avoided, the anchorage for one end of the band first engaged by a cigarette being arranged above the surface of the other band so that the latter is overlapped by the band first engaged by a cigarette, a guide disposed between the overlapping parts of the bands and a selector movable in timed relationship with the conveyor to move a cigarette out of the path of the conveyor and over the surface of said guide.

5. In apparatus for conveying cigarettes through a curved path, a conveyor comprising two adjacent surfaces disposed in non-parallel planes, a pair of thin flexible bands each of which partly encircles the path of the conveyor and relatively to which a cigarette engaged by the conveyor is movable, an anchorage connected with opposed ends of each of the bands to tension the bands in the direction of movement of the conveyor to an extent such that movement of a cigarette into engagement with the bands by the conveyor causes the bands to yield and to retain the cigarette against said surfaces of the conveyor so that movement of the cigarette rela-

tively to the conveyor is substantially avoided, the anchorage for one end of the band first engaged by a cigarette being arranged above the surface of the other band so that the latter is overlapped by the band first engaged by a cigarette, a guide disposed between the overlapping parts of the bands, a selector movable in timed relationship with the conveyor to move a cigarette out of the path of the conveyor and over the surface of said guide, projections on the selector to form a recess to receive the selected cigarette and a pivoted element disposed above said guide to retain the cigarette in said recess.

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