

Nov. 22, 1932.

R. E. RUNDELL

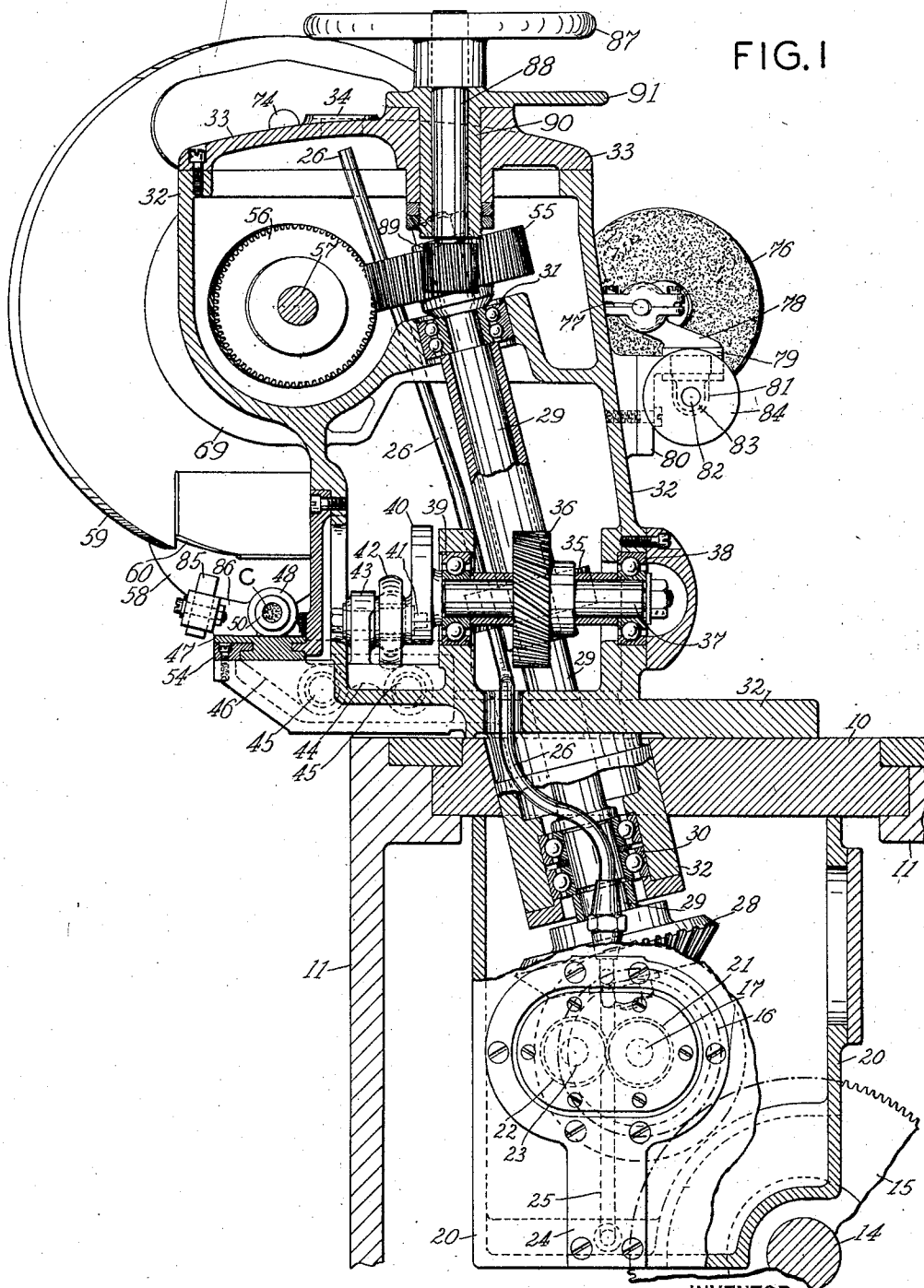
1,888,774

OBLIQUE CUT-OFF

Filed Feb. 4, 1931

4 Sheets-Sheet 1

FIG. 1



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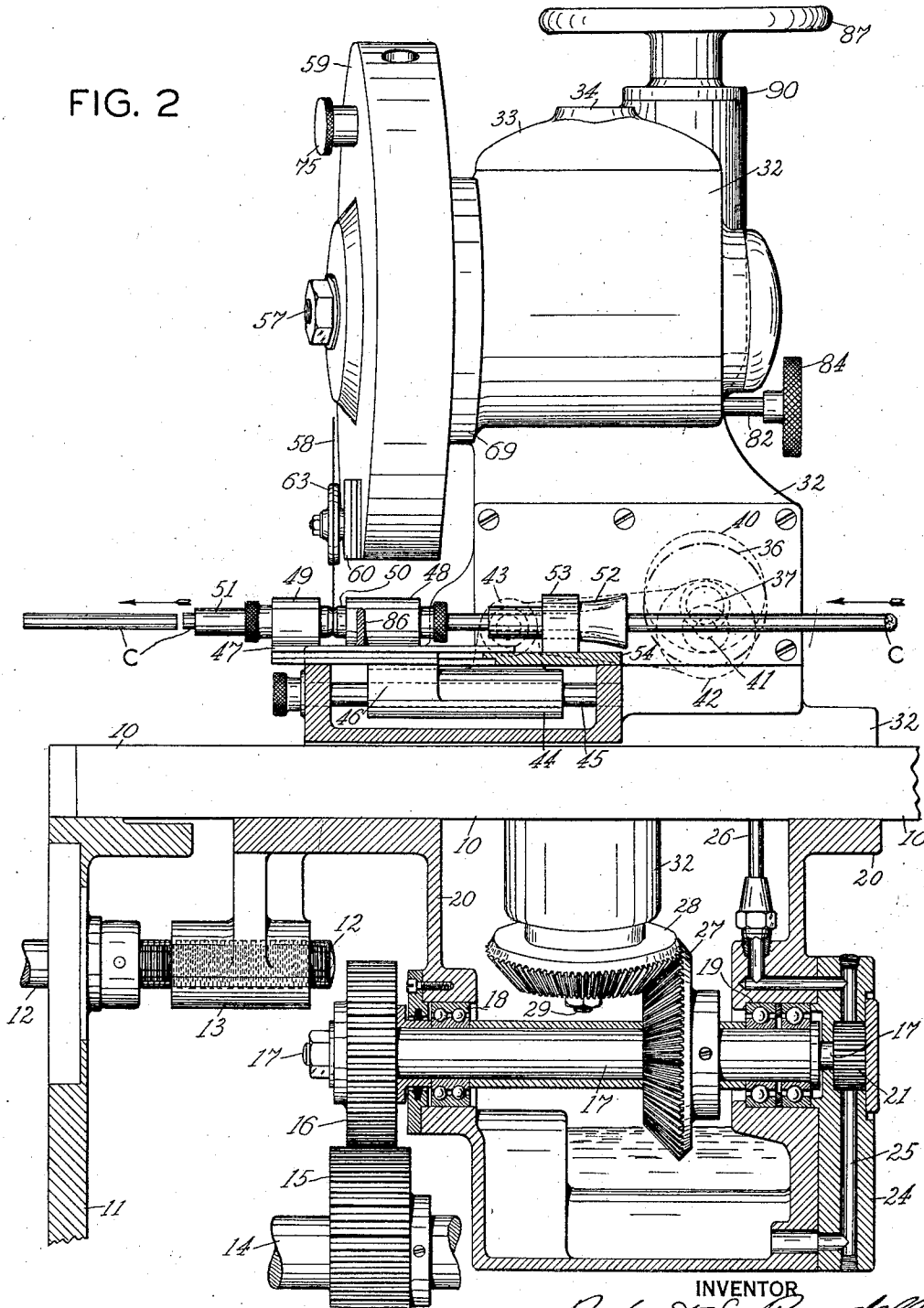
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FIG. 2



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FIG. 3

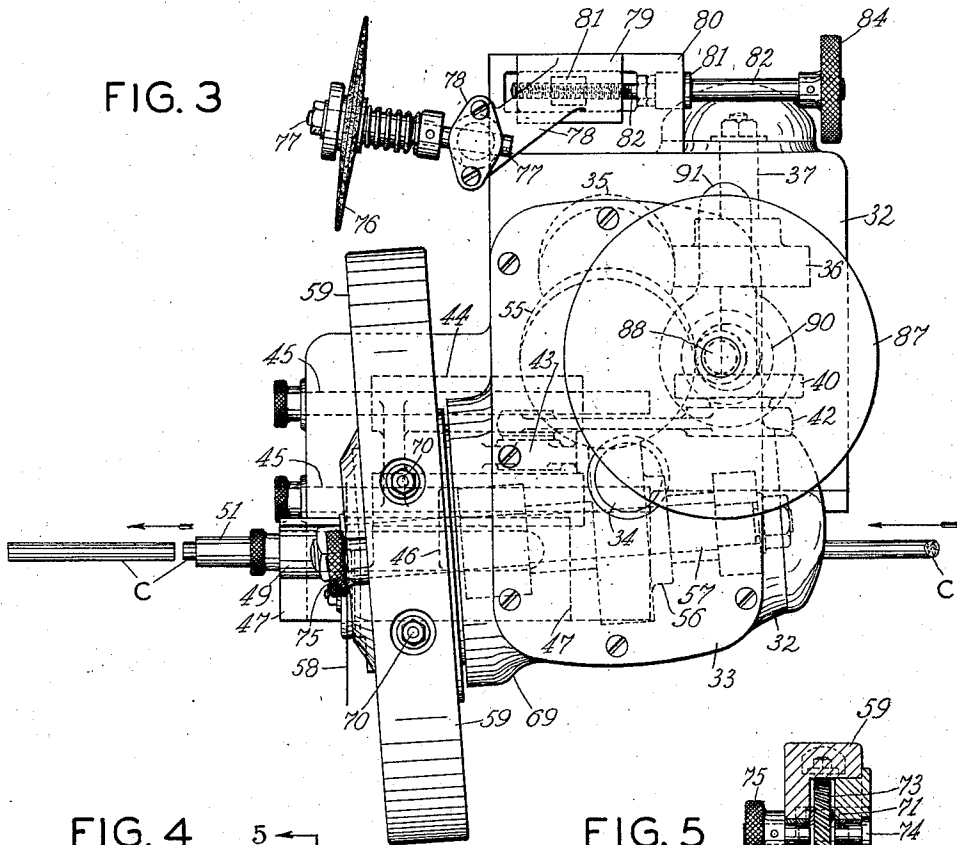


FIG. 4

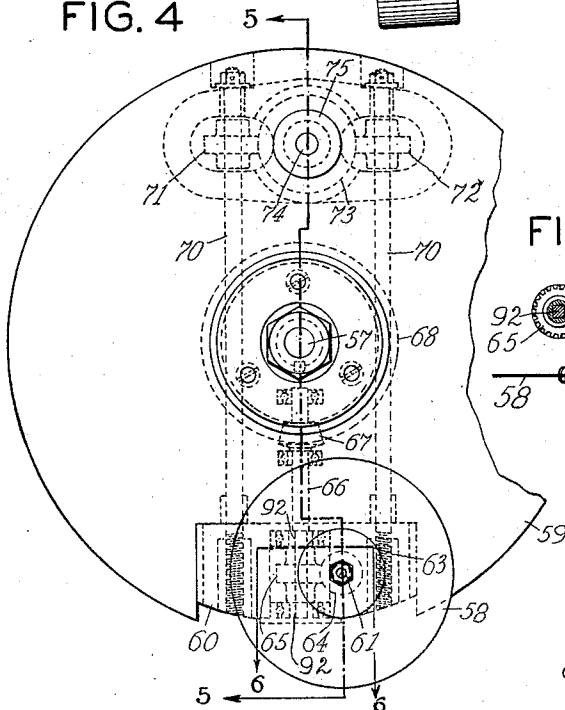


FIG. 5

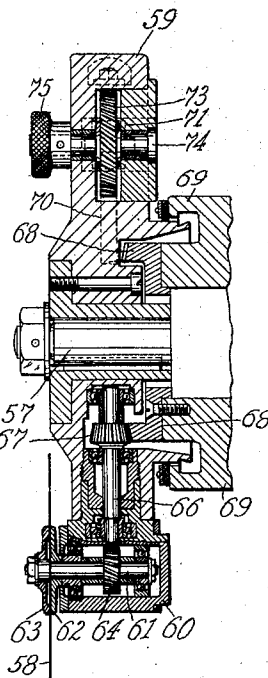
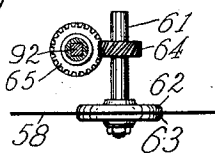


FIG. 6



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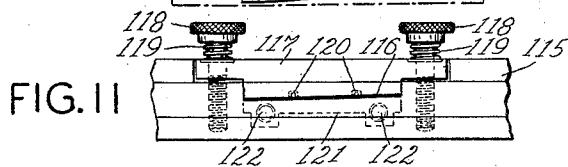
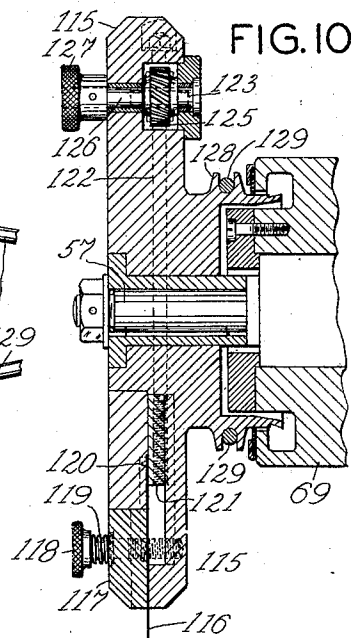
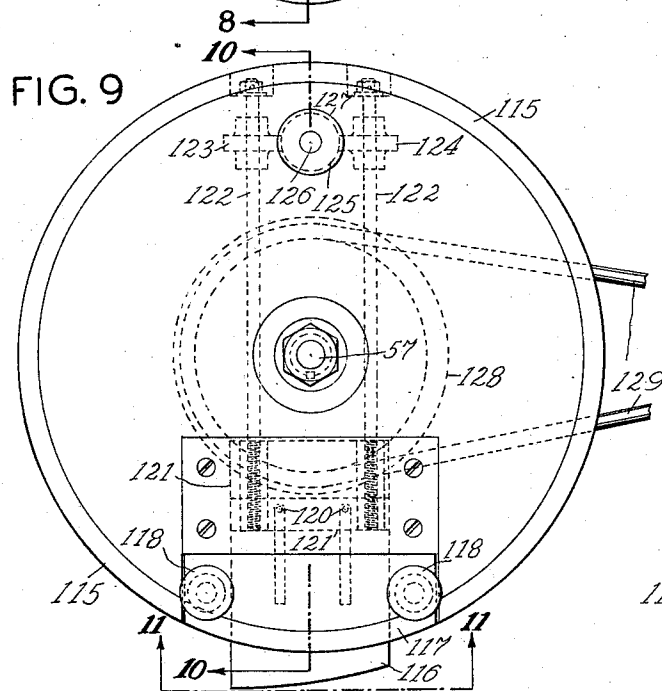
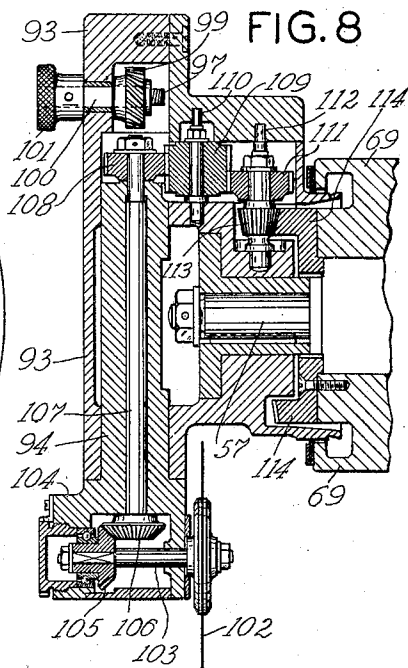
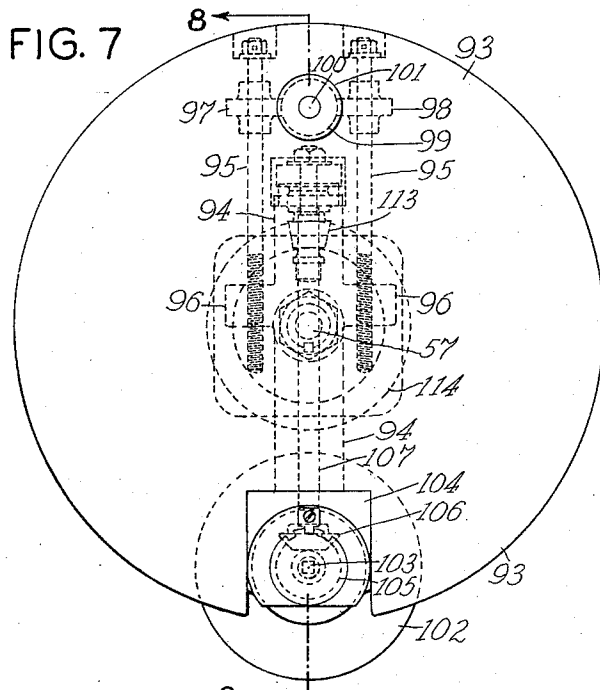
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4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

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OBLIQUE CUT-OFF

Application filed February 4, 1931. Serial No. 513,399.

This invention relates to cutoffs for continuous rod cigarette machines and particularly to cutoffs of the type in which the cutoff knife travels in an orbital path oblique to the cigarette rod so that the cutting edge of the knife has a movement along the rod sufficient to compensate for the movement of the rod. An example of such a cutoff is that disclosed in my prior Patent No. 1,487,028, granted March 18, 1924. The main object of the present invention is to improve this type of cutoff. To this end it is an object of the invention to provide a cutoff which has simple rotary motion without any reciprocating parts while permitting ready and convenient adjustment of the cutoff knife for wear; and for convenience to permit this adjustment while the knife is in engagement with the ledger tube.

Another object of the invention is to provide for rotating a disk cutoff knife while it is carried in an orbital path, and to so construct this cutoff that its rotation does not interfere with adjustment, and in which a relatively simple construction is employed. Still another object of the invention is to provide a construction in which the above mentioned rotating disk type knife can be readily interchanged with a blade of the type known as a wafer or eccentric blade which is fixedly secured to a carrier rotating on an axis oblique to the cigarette rod. To this end the disk cutoff knife is driven from a stationary gear coaxial with the carrier and about which the carrier rotates thus driving gearing on the carrier which drives the cutoff knife, a construction permitting ready interchange of carriers and associated parts as will appear from the detailed disclosure. Another object is to provide adjusting means for moving the cutoff knife radially of the carrier to compensate for wear, which is self locking against any radial movement during operation. Still another object is to reduce the weight of the parts which are radially adjusted to compensate for wear thereby reducing the weight which is moved off center and therefore is to some extent unbalanced. A further object is to equip the cutoff with a force feed lubrication system and to provide it with an oil

tight connection between the carrier and the bearing for the carrier shaft.

With these and other objects in view, the invention consists in certain constructions and combinations which will be hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a front elevation in section of the improved cutoff;

Fig. 2 is a side elevation partly in section of the cutoff shown in Fig. 1;

Fig. 3 is a plan view of the cutoff shown in Fig. 1;

Fig. 4 is a front elevation of the knife carrier disk and associated parts shown in Fig. 1;

Fig. 5 is a sectional side elevation of the device shown in Fig. 4;

Fig. 6 is a detail view on the line 6—6 of Fig. 4 of certain parts shown therein;

Fig. 7 is an end view of a modification of the disk carrier head, also having a circular knife;

Fig. 8 is a sectional side elevation of the mechanism shown in Fig. 7, taken on line 8—8;

Fig. 9 is an end view of another modification of the disk carrier head carrying a wafer knife blade;

Fig. 10 is a sectional side elevation of the disk carrier shown in Fig. 9, taken on line 10—10; and

Fig. 11 is a detailed view taken on line 11—11 of Fig. 9 showing the manner of supporting the wafer knife and the carrier disk.

In carrying the invention into effect, there is provided a cutoff having a reciprocating ledger tube, a cutoff knife, a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette, and means for adjusting said knife radially of the carrier to compensate for wear. In the best constructions contemplated, the cutoff knife may have the form of a disk knife or a wafer blade, and the means for adjusting the cutoff knife may include a knife carrying slide adjust-

ably mounted on the carrier and adjusted by means of self locking mechanism. In the preferred form of construction, the knife may be rotated by gearing on the carrier which is driven from a stationary gear through the rotation of the carrier. These various means and parts may be widely varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be limited to the particular construction shown and described.

The entire cutoff is mounted on a bed plate 10 slidably supported in the main frame 11 of the cigarette machine. The plate 10 is adjustable by means of the screw 12 supported in frame 11 and engaging with the threaded adjusting bracket 13 attached to plate 10. The cutoff is driven from the main shaft 14 of the cigarette machine on which is mounted a gear 15 driving a gear 16 on a counter shaft 17 supported by bearings 18 and 19 in the gear housing 20 mounted on the under side of plate 10. Shaft 17 carries a gear 21 in mesh with a gear 22 on shaft 23; these gears, in combination with the pump plate 24, forming a gear pump attached to the housing 20 which is adapted to hold a supply of lubricating oil and serves as an oil reservoir. Gears 21 and 22, through conduit 25 in plate 24, suck the oil from the housing 20 and pump the same through pipe 26 to the highest moving part of the cutoff from where it will come down by gravity and again collect in the housing 20.

On shaft 17 is mounted a bevel gear 27 driving a bevel gear 28 on shaft 29 mounted in bearings 30 and 31 of the housing 32 which is attached to the top face of bed plate 10. Housing 32 is closed oil tight by means of cover 33 equipped with a glass look hole 34 which enables the operator to see if the oil is flowing freely and thus to discover pump trouble. Shaft 29, which is set at an angle, carries the spiral gear 35 meshing with spiral gear 36 on shaft 37 mounted in bearings 38 and 39 of housing 32. Shaft 37 carries an eccentric counter balance 40 having a crank pin 41 which, through connecting rod 42 pivoted to lug 43, actuates the slide 44 supported on guide rods 45 fastened to housing 32. Slide 44 has the lug 46 carrying guide plate 47 to which are fastened the lugs 48 and 49, the former holding the ledger tube 50 while the latter holds the guide tube 51. The slide 44 and the parts connected with it receive reciprocating motion through connecting rod 42 from shaft 37 at the same speed as that of the cigarette rod C which, through a stationary mouth tube 52, enters the ledger tube 50 and the guide tube 51. The mouth tube 52 is mounted in lug 53 fastened to cover plate 54 on housing 32.

On the upper end of shaft 29 is mounted a spiral gear 55 driving a spiral gear 56 on carrier shaft 57 which is supported in bearings of the housing 32 and placed at such an angle with the cigarette rod C that the disk cutoff knife 58 carried by the carrier 59 on shaft 57 travels back and forth axially at the same speed as the cigarette rod. The carrier 59 has the adjustable slide 60 supporting, on knife shaft 61, the disk cutoff knife 58 clamped thereon by flanges 62 and 63. The knife shaft 61 is driven from spiral gear 64 meshing with spiral gear 65 journaled on the slide 60 and slidably mounted on square end 92 of shaft 66. The latter carries the bevel gear 67 which, by the rotation of carrier 59 is rotated by its engagement with a stationary bevel gear 68 fastened to the stationary bearing 69 of the housing 32. This bearing is provided with an annular flange surrounding an annular flange on the inner face of the carrier 59, and a packing engaging the carrier flange. In this manner an oil tight connection between the carrier 59 and the stationary bearing 69 is provided.

The slide 60 is adjusted by a pair of axially fixed right and left hand screw shafts 70 having right and left hand threads, respectively, on their lower ends which are threaded into the slide 60 and provided at their other ends with the spiral gears 71 and 72. The latter are actuated by spiral gear 73 on shaft 74 which is equipped with a knob 75 for turning the same. This arrangement has the advantage of acting as an automatic locking device for any adjustment made, since any radial movement of the slide 60 due to the centrifugal force on the slide while the carrier 59 is rotating, or for any other reason, would tend to turn the adjusting shafts 70 in the same direction and thus lock against the adjusting gear 73.

In order to prevent the cutoff knife 58 from dulling during its operation, the cut-off is equipped with a grinding wheel 76 loosely mounted on shaft 77 adjustably supported in bracket 78 attached to plate 79. The latter is slidably supported by bracket 80 having a lug 81 in which is axially secured an adjusting screw 82 engaging lug 83 of plate 79 and equipped with a knob 84 by which it can be turned to bring the grinding wheel 76 nearer to or farther away from the knife 58.

To remove any burrs which may be produced by the wheel 76, the knife is made to engage a burring stone 85 adjustably mounted on an extension 86 of the ledger plate lock 48.

To facilitate the proper adjustment of the cutoff, the latter is arranged to be turnable by hand. A hand wheel 87, conveniently located on the top of the cutoff, is mounted on a vertical shaft 88 having a spiral gear 89 engaging with spiral gear 55 on shaft 29 which controls the entire mechanism. Shaft

88 is loosely mounted in an eccentric sleeve 90 equipped with a handle 91 through which it is possible to disengage spiral gear 89 from spiral gear 55 when the cutoff is under power.

Referring to Figs. 7 and 8, which show a modified form of carrier for the cutoff knife, the knife carrier 93 which is adapted to be mounted on the carrier shaft 57, is equipped with the slidably supported slide 94 held by the axially fixed screw shafts 95 engaging in the lugs 96 of slide 94, one of the shafts 95 engaging the lug with a right hand and the other with a left hand thread. On the other ends of shafts 95 are mounted spiral gears 97 and 98. The latter are actuated by spiral gear 99 on stud 100 equipped with a knob 191 for turning the same. This arrangement acts as a self locking device for any adjustment made, similar to the arrangement in the knife carrier 59 described heretofore. The disk cutoff knife 102 is mounted on knife shaft 103 supported by bearings in the lower part 104 of the slide 94. Knife shaft 103 carries the bevel gear 105 driven by bevel gear 106 on shaft 107 supported by slide 94. On shaft 107 is mounted gear 108 engaging with a gear 109 on stud 110. Gear 109 is driven from gear 111 on stud 112 which carries the bevel gear 113 which by the rotating of carrier 93 is rotated by its engagement with the stationary bevel gear 114 mounted on flange 69. All the gears in this carrier are so arranged that they will be in mesh at all times, whether the slide 94 be in its inner or outer position.

Referring to Figs. 9, 10, and 11, which show another modification of the cutoff carrier, the carrier 115, which is also adapted to be mounted on shaft 57 carries a cutoff knife having the form of a wafer blade 116 secured to the carrier 115 by clamp bridge 117 held by thumb screws 118 and receiving tension from the springs 119. In order to adjust the knife 116 radially of the carrier 115, the former is provided with two holes into which are fitted pins 120, which project into aligned slots in carrier 115 and plate 117 and are mounted on slide 121 in engagement with axially fixed screw shafts 122 carrying spiral gears 123 and 124. One of the shafts 95 engages with a right hand and the other with a left hand thread in the slide 121. Spiral gears 123 and 124 are actuated by spiral gear 125 on stud 126 equipped with a knob 127 for turning the same. By this means it will be observed that the knife 116 may be adjusted while it is clamped to the carrier 115 and slide 121 by the clamp bridge 117. This arrangement for the adjustment of the cutoff knife is the same as in all the other carriers described, and has the same purpose of automatically locking any adjustment made. The carrier 115 is equipped with a groove 128 to accommodate a belt 129 which drives the grinding wheel, the rotation of

which is essential for a wafer blade cutoff knife.

What is claimed is:

1. In a cutoff for continuous rod cigarette machines, the combination with a cutoff knife, of a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette rod, and mechanism for adjusting said knife radially of said carrier, said mechanism including a slide on which said knife is mounted, two axially fixed screw shafts supported by said carrier and oppositely threaded into said slide at one end and provided with gears at their other ends, and a knob rotatably mounted in said carrier and connected to a gear meshing with the gears on said screw shafts, whereby rotation of said carrier will lock said gears.

2. In a cutoff for continuous rod cigarette machines, the combination with a cutoff knife having the form of a wafer blade, of a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette rod, and mechanism for adjusting said knife radially of said carrier, said mechanism including a radially adjustable slide mounted in said carrier and a clamp bridge yieldingly secured to said carrier for clamping said knife against said slide and carrier and permitting adjustment of said slide and blade while said slide is clamped to said carrier.

3. In a cutoff for continuous rod cigarette machines, the combination with a rotary cutoff knife, of a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette rod, gear means for rotating said knife, and mechanism for moving said knife radially of said carrier, whereby to adjust it to compensate for wear, said mechanism including a radially adjustable slide, and said knife having its shaft mounted in said slide and having a gear mounted on its shaft, and said gear means including a stationary gear and a shaft mounted in said slide and driven from said stationary gear and having a gear driving the gear on said knife shaft.

4. In a cutoff for continuous rod cigarette machines, the combination with a rotary cutoff knife, of a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette rod, gear means for rotating said knife, and mechanism for moving said knife radially of said carrier, whereby to adjust it to compensate for wear, said gear means including a stationary gear and gearing on said carrier driven from said gear and driving said knife, said knife being of disk form, and said mechanism including a slide on which said knife and gearing are rotatably mounted.

5. In a cutoff for continuous rod cigarette machines, the combination with a rotary cutoff knife, of a carrier for said knife, means

for rotating said carrier on an axis inclined to the cigarette rod, gear means for rotating said knife, and mechanism for moving said knife radially of said carrier, whereby to adjust it to compensate for wear, said gear means including a stationary gear, a shaft rotatably mounted in said carrier and having a gear on one end meshing with said stationary gear and a gear on its other end for driving said knife.

6. In a cutoff for continuous rod cigarette machines, the combination with a rotary cutoff knife, of a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette rod, gear means for rotating said knife, and mechanism for moving said knife radially of said carrier, whereby to adjust it to compensate for wear, said gear means including a stationary gear, a train of gears on said carrier driven from said stationary gear, and a shaft having a gear on one end driven by said gear train and a gear at its other end for driving said knife.

7. In a cutoff for continuous rod cigarette machines, the combination with a cutoff knife, of a rotating carrier for said knife, means mounting said knife on said carrier for rotation about its own axis and also for movement by the carrier in an orbital path traversing the cigarette rod, a stationary gear coaxial with said carrier, the axes of said gear and carrier being in alignment with each other, and gearing on said carrier driven by movement of the carrier relative to the stationary gear for driving said knife, the axis of said carrier being inclined to the cigarette rod and said knife being disposed in a plane perpendicular to the cigarette rod.

8. In a cutoff for continuous rod cigarette machines, the combination with a disk cutoff knife, of a rotating carrier for said knife, means mounting said knife on said carrier for rotation about its own axis and also for movement by the carrier in an orbital path traversing the cigarette rod, a stationary gear coaxial with said carrier, the axes of said gear and carrier being in alignment with each other and gearing on said carrier driven by movement of the carrier relative to the stationary gear for driving said knife, said mounting means including self-locking mechanism for adjusting the axis of rotation of the disk knife in a radial direction on the carrier.

9. In a cutoff for continuous rod cigarette machines, the combination with a cutoff knife, of a rotating carrier for said knife, means mounting said knife on said carrier for rotation about its own axis and also for movement by the carrier in an orbital path traversing the cigarette rod, a stationary gear coaxial with said carrier, and gearing on said carrier driven by movement of the carrier relative to the stationary gear for driving said knife, said gearing including a radially extending driven shaft on the carrier having fixedly on

its inner end a gear meshing with said stationary gear, and having another gear slidable on the outer end of said shaft, and said means including a slide adjustable radially of said carrier and on which said knife is mounted, the outer gear being journaled on said slide and movable therewith.

10. In a cutoff for continuous rod cigarette machines, the combination with a perforated cutoff knife having the form of a wafer blade, of a carrier for said knife, and mechanism for adjusting said knife radially of said carrier, said mechanism including an adjustable slide having pins adapted to engage in the perforations in said knife, and a clamp bridge yieldingly secured to said carrier, for clamping said knife to said slide and carrier, whereby said knife may be adjusted while it is clamped to said carrier.

11. In a cutoff for continuous rod cigarette machines, the combination with a cutoff knife, of a carrier for said knife, said carrier being provided with a radially adjustable slide on which said knife is rotatably mounted, and having gearing mounted in said slide for driving said knife said gearing including a shaft extending radially of said carrier and loosely mounted in said slide and provided with a gear fixed on its outer end.

12. In a cigarette cutoff for continuous rod cigarette machines, the combination with a reciprocating ledger tube, of a rotary cutoff knife, a carrier for said knife, means for rotating said carrier on an axis inclined to the cigarette rod, mechanism for adjusting the knife on said carrier and gear means for rotating said knife, said gear means including a stationary gear and gearing on said carrier driven by said gear and driving said knife, said mechanism being operative to lock itself when said carrier is rotating.

13. In a cutoff for continuous rod cigarette machines, the combination with an adjustable bed plate, of a housing mounted on the under side of said bed plate and adapted to hold a supply of lubricating oil, a housing mounted on the top face of said bed plate, a cutoff knife, a carrier for said knife, means supported by said housings and bed plate for rotating said carrier and mechanism for pumping lubricating oil from said lower housing to said upper housing.

14. In a cutoff for continuous rod cigarette machines, the combination with an adjustable bed plate, of a housing mounted on the under side of said bed plate and adapted to hold a supply of lubricating oil, a housing mounted on the top face of said bed plate, a cutoff knife, a carrier for said knife, means supported by said housings and bed plate for rotating said carrier and mechanism for pumping lubricating oil from said lower housing to said upper housing, said mechanism including a pipe leading from the lower housing to the upper housing, a conduit connect-

ing said pipe to the supply of oil in the lower housing, and intermeshing gears mounted in said conduit for pumping the oil.

15 In a cutoff for continuous rod cigarette machines, the combination with a cutoff knife, of a carrier for said knife, a rotating shaft
5 supporting said carrier, a stationary bearing for supporting said carrier shaft, and means for providing an oil tight connection between said carrier and said stationary bearing, said
10 means including an annular flange projecting from the inner face of said carrier, an annular flange on said bearing surrounding said carrier flange, and a packing carried by one of
15 said flanges and engaging the other.

In testimony whereof, I have signed my name to this specification.

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