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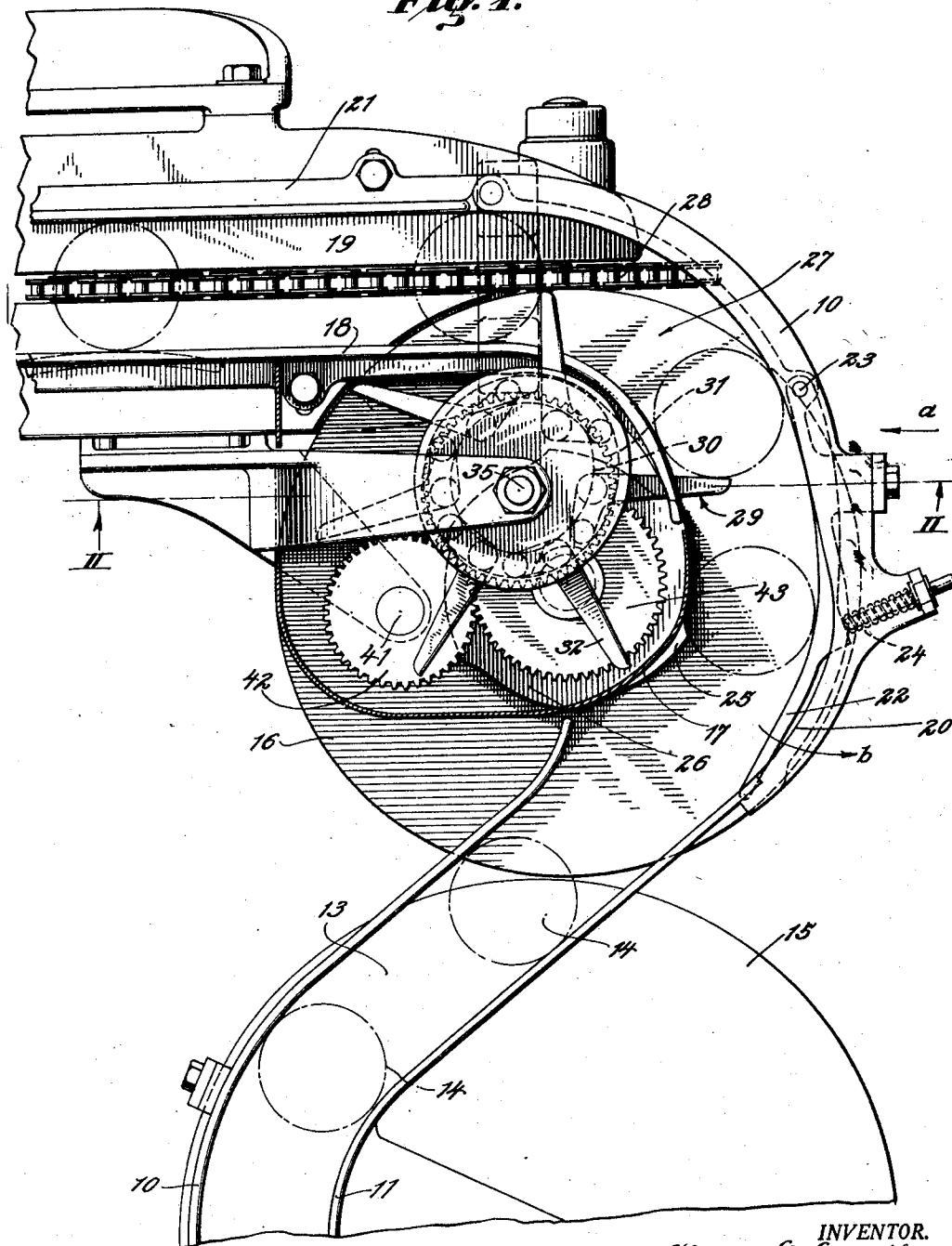
H. L. GUENTHER
ACCELERATING CAN FEED

1,820,562

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2 Sheets-Sheet 1

Fig. 1.



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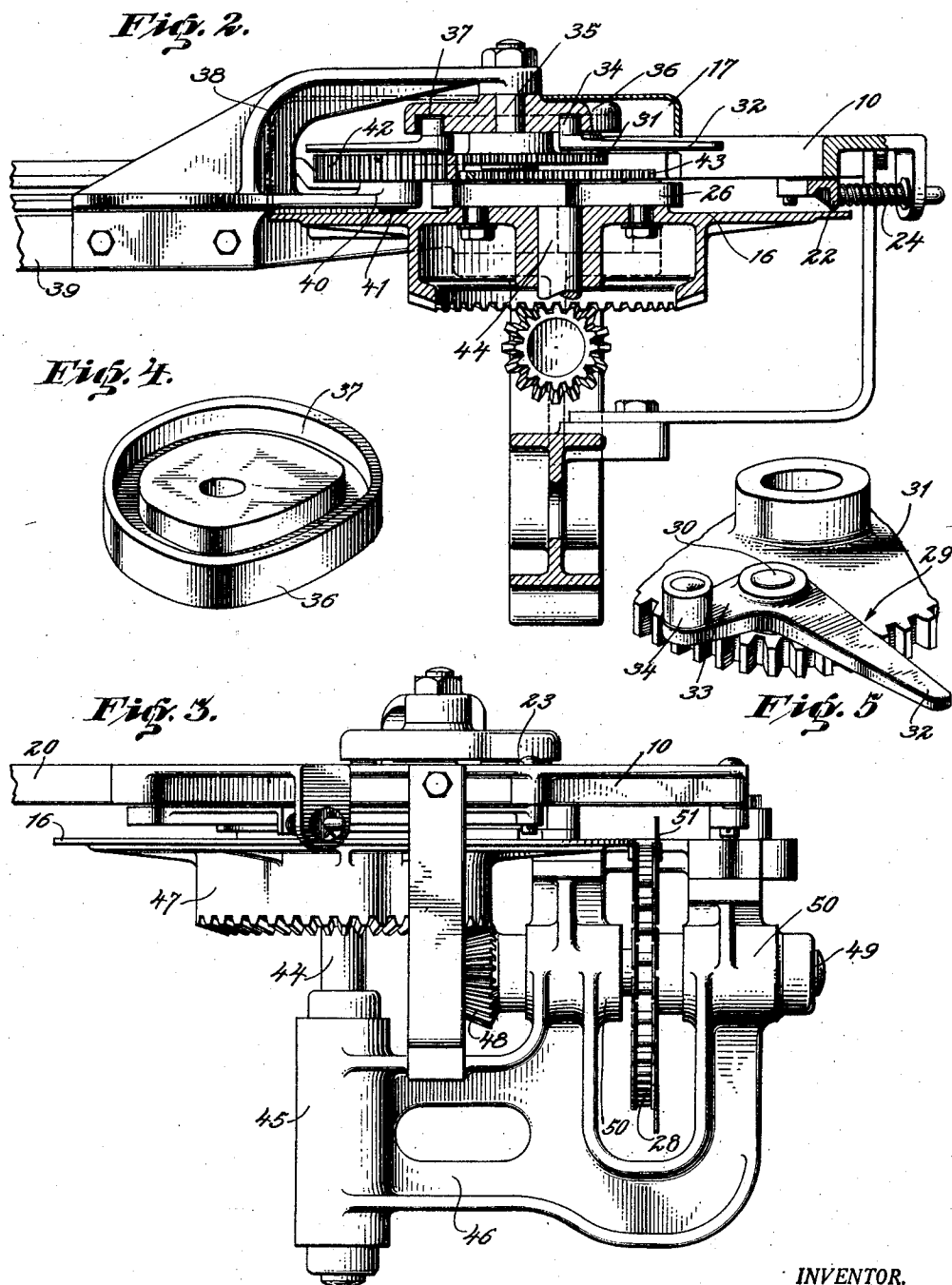
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ACCELERATING CAN FEED

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This invention relates to canning machinery, and particularly pertains to an accelerating can feed for delivering cans to double seamers and like machines.

5 In the operation of double seaming machines for closing cans filled with material, and for seaming a cap onto the well known sanitary can body, it is the present tendency of design to operate the machines at relatively high rates of speed, and since it is impracticable to create a high speed flow of cans prior to delivery to the machine, it is necessary to provide an accelerating mechanism for spacing and accelerating the speed 10 of the cans as they are delivered in timed relation to the double seaming mechanism, so that the contents of the cans will not be disturbed or violently agitated sufficiently to cause the cans to slop prior to the time a cap 20 is applied to them.

The present invention is therefore concerned with an accelerating means interposed between a constant flow of cans at a relatively low speed, and a double seaming mechanism operating at a relatively high speed and which accelerating means will act to gradually increase the speed of a can from its initially low speed to the speed of the double seaming machine at the time of delivery thereto. 30

The present invention contemplates the provision of a rotary can support upon which cans are delivered and by which they are advanced, due to frictional contact teeth and a plurality of can accelerating arms acting in conjunction, and in timed relation to the disc and the cans thereon, to separately engage the cans and to accelerate their speed from that of the can flow to the speed of the positive conveying mechanism forming a part of a double seaming machine. 35

The invention is illustrated by way of example in the drawings, in which

Fig. 1 is an enlarged fragmentary view in plan showing the accelerating mechanism and the parts in conjunction with which it operates. 40

Fig. 2 is a view in central vertical section through the accelerating mechanism, as seen on the line 2—2 of Fig. 1. 45

Fig. 3 is an enlarged view in elevation showing the accelerating mechanism as viewed in the direction of the arrow "a" in Fig. 1.

Fig. 4 is a view in perspective showing the accelerating cam in an inverted position to disclose the formation of its cam groove. 55

Fig. 5 is a fragmentary view in perspective showing one of the cam accelerating arms. 60

Referring more particularly to the drawings, 10 and 11 indicate side rails of a can runway 13, along which a flow of cans 14 pass. The floor of the runway at its inlet end is formed by a rotary supporting disc 15 onto which the cans are delivered, and by which they are advanced. The speed of rotation of the disc 15 is such as to cause the cans delivered thereonto to be accelerated in their speed of travel and to be separated as they advance,—it being understood that prior to the delivery of the cans onto the disc 15 they are crowding forwardly in the runway and are disposed one against the other. 70

The outlet throat of the runway 13 overhangs a rotary feed disc 16 which is disposed in the same horizontal plane with the feed disc 15, which permits the cans to pass from one feed disc to the other. The outlet portion of the can runway 13 is in tangential alignment with the initial path of travel of the can as it rests upon, or moves forwardly on the disc 16. The path of travel of the can while upon the disc 16 is determined by a housing 17, forming a substantial continuation of the rail 10 and bridging a space between this rail and a fixed rail 18 along which the can may move to a positive feed runway 19. The opposite side of the path of travel of the can while upon disc 16 is defined by an eccentric guide rail 20 extending for a distance concentric with the disc 16, and then swinging outwardly and around to unite with rail 21 of the positive feed runway 19. The guide rail 20 is, however, supplemented by a yieldable escapement member 22 which is of arcuate shape and is mounted upon a pin 23. The can contacting face of this escapement mem- 100

ber is described by a larger radius than that of the rail 20, and is normally and yieldably held in the path of travel of the cans by a spring 24 so that a restricted throat will be formed between the escapement member 22 and the housing 17, to retard the advance of the cans 14, until each particular can has been overtaken by a point or tooth 25 of a timing star wheel 26. As seen in Fig. 1 of the drawings, these teeth are spaced a considerable distance apart and are formed with a concave can engaging face and a long sweeping convex back face, so that in the event the delivered can does not register precisely with the concave engaging face when it comes into contact with the star wheel it may roll along the convex back face of the tooth as it is being yieldably rotated by escapement member 22, and while the feed disc 16 is advancing beneath it until it is positively engaged by the tooth, after which it will be positively advanced through the machine and in timed relation to the cans which have preceded it.

Thus it will be seen that the cans move in sequence through the machine and in positive timed relation to each other.

After a can has been positively engaged by the advancing face of a tooth 25 on the star wheel 26, it will be positively moved along the eccentric runway 27, formed by the curved portion of the rail 18 and the curved rail 20, and will swing the escapement member 22 outwardly in the direction of the arrow "b" to accommodate the can and to permit it to advance without further resistance.

It is evident that while the can is traveling along the eccentric path of travel defined by the eccentric runway 27, and while it is being gradually moved outwardly over the surface of the feed disc 16 upon which it rests, it will be accelerated in its speed of advance. This acceleration, however, is not sufficient to deliver the can to the positive feed chain 28 at the lineal speed at which this chain is moving, and it is, therefore, necessary to have positive can accelerating means which will "pick up" the advancing can and positively and gradually increase its speed of travel to that of the double seaming machine and its feed means.

The positive accelerating means comprises a plurality of bell cranks 29, which are seen in Fig. 5 of the drawings, as being mounted by vertical pins 30 upon the upper face of an accelerating gear 31. The bell cranks are disposed to swing in a horizontal plane and each comprise a radial feed arm 32 adapted to be projected into the path of travel of the can, and an operating arm 33 carrying a cam roller 34.

In the present instance six bell cranks 29 are shown as carried by the accelerating gear 31. This gear is mounted concentrically

upon a spindle 35, and is free to rotate thereon. A grooved cam 36 is keyed onto said spindle 35 above the gear 31 and is formed with a groove 37 in its lower face, and into which groove the cam rollers 34 project. It will therefore, be evident that as the bell cranks 29 move along their concentric path of travel with relation to the spindle 35, the cam rollers 34 will engage the groove 37 of the cam 36 and will individually swing upon their pivots 30 to describe varying portions of arcuate travel around their pivots at different points along their bodily concentric path of travel with relation to the spindle 35.

By reference to Fig. 1 of the drawings, it will also be seen that the spindle 35 is disposed eccentrically with relation to the vertical axis of the feed disc 16 and is so positioned as to insure that the accelerating arms 32 will engage and advance the cans along the quadrant of the disc 16, terminating with the point of delivery of the cans onto the positive feed chain 28.

The spindle 35 is carried in an overhanging bearing arm 38, secured to the bed plate 39 of the machine. This arm structure also carries a bearing arm 40 supporting a vertical shaft 41 upon which a gear 42 is freely mounted. This gear has a relatively wide face and is in mesh with the accelerating gear 31, as well as a driving gear 43 disposed therebeneath. The driving gear is secured upon the upper end of a shaft 44 which also carries the star wheel 26 and the feed disc 16. The shaft 44 is rotatably mounted in a suitable bearing 45, formed as a part of a subframe bracket 46.

It will therefore, be seen that rotation of the shaft 44 by means hereafter to be described, will produce rotation of the gear 42 and consequent rotation of the accelerating gear 31 at a predetermined different speed as brought about by the gear ratios between the three gears in the train.

The entire gear and feed mechanism is driven through a beveled gear 47 secured to the under side of the feed disc 16, and in mesh with a pinion 48. This pinion is carried on a horizontally disposed shaft 49 mounted in suitable bearings 50 of the subframe bracket 46.

As shown in Fig. 3 of the drawings, the shaft 49 carries a sprocket 50 and a sprocket chain 28. The upper run of the chain 28 is provided to positively carry the cans into the double seaming machine (not shown in the drawing) at the speed of operation of the machine, and in order to do this the chain is fitted with a plurality of flights 51, which move in synchronism with the radial arms 32 and engage the cans delivered in advance thereof to positively move them forwardly along the runway 19. The sprocket chain 28 is in mesh with a suitable sprocket car-

ried as part of the double seaming machine and will be driven therefrom, thus insuring that all of the feed mechanism, including the positive and accelerating mechanisms will operate in true synchronism with the double seaming machine.

In operation of the present invention it will be understood that this machine may form a part of a double seaming machine used for making cans, or a double seaming machine used to finally close filled cans. In the first instance the machine will act to time and feed the cans into the machine, but when filled cans are used it provides an additional advantage in that the cans are carefully handled, timed and fed forwardly at an accelerated rate of speed from slow moving continuously crowding flow of cans along the runway 13, to a separated and positively spaced flow through the timing mechanism at accelerated speed, and to a relatively high speed positive mechanism.

The inflowing cans travel between the rails 10 and 11 and are advanced by the initial feed disc 15. As they are crowded forwardly, the speed of rotation on the feed disc 15 will tend to separate them and will move them in succession across the edge of the feed disc and onto the feed disc 16. This disc will then carry the can forwardly, by frictional driving, and into the throat formed between the arcuate portion of housing 17 and the escapement member 22. As the can tends to advance, the escapement member 22 will retard it until it is positively engaged by the teeth 25 of the star wheel 26.

In the event that the can accurately registers with the arcuate front face of a tooth on the star wheel when it comes into contact with the star wheel, the can will immediately be forced forwardly,—but if the can should contact with the star wheel at any other point then just in advance of a tooth, the escapement member will rotate the can and cause it to roll along the back face of a tooth until the arcuate seat of the next tooth registers with it, after which the can will be positively advanced and will force the escapement member 22 out of its path of travel as it moves along between rails 18 and 20.

Following each tooth 25 of the star wheel 26, in its path of travel, is one of the accelerating arms 32. These arms are so designed and provided with the spreading mechanism, previously described, to act in overtaking the tooth adjacent it and in thus engaging the can and thereafter accelerating its speed beyond that of the star wheel 26, so that the can will move across the advancing disc and outwardly to a point where it is superposed over the positive feed chain 28.

The operation of the can accelerating arms is brought about by the relative rotation of the gear 31 with relation to the gear 43.

The gear 43 is positively secured to the star wheel 26 and moves in unison with the star wheel 26 and a disc 16. This gear acts through the pinion 42 to drive the accelerating gear 31. The accelerating gear is mounted on spindle 35 which is in vertical alignment with the shaft 44, carrying the feed disc 16. The bell cranks 29, the cam 36 and the gears are so designed as to insure that the arms 32 of the bell cranks 29 will not maintain constant angularity with relation to the axis of spindle 35, but will swing forwardly in the direction of rotation of the accelerating gear 31. The cam will, therefore, make it possible for the outer ends of the accelerating arms 32 to travel at a gradually accelerated rate of speed with relation to the speed of the accelerating gear by which they are being bodily carried. This action will, however, be produced only during a portion of the travel of the bell cranks and will insure that the cans which are positively and properly engaged by the teeth 25 of the star wheel 26, will thereafter be engaged by the outer end of an accelerating arm 32, and will be moved forwardly at the desired gradual speed of acceleration until the speed of the can equals the speed of travel of a positive can conveying means, such as the chain 28.

When the cans are shifted off of the feed disc 16 and onto the floor of the runway 19, they will be immediately and positively engaged by flights 51, carried by the feed chain 28, and will be advanced into the seaming machine at the rate of speed at which the seaming machine is operated.

It will thus be seen that the structure here disclosed provides a simple mechanism for gradually accelerating the speed of filled or empty cans, and for insuring that filled cans may be transmitted from a slowly moving flow of cans to a high speed seaming mechanism by gradual motion which will preclude possibility of slopping the contents from the cans, or in otherwise objectionably disturbing the contents of the cans.

While I have shown the preferred form of my invention, as now known to me, it will be understood that various changes may be made in the combination, construction and arrangement of parts without departing from the spirit of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A can feed mechanism adapted to feed cans to a relatively high speed positive feed means, comprising a horizontally disposed rotary disc onto which cans are deposited at a relatively slow speed and by which the cans are advanced, means for yieldably retarding the advance of the cans along the disc, a positive timing star wheel adapted to cooperate with said retarding means to

positively separate and time the cans with relation to the feed means, and a plurality of radial arms disposed in a horizontal plane and moving bodily around a common axis and located above and engaging cans carried by the rotary disc, said arms being moved in said horizontal plane at variable speeds during their circular path of travel whereby a can will be positively engaged thereby and will be moved to the high speed feed means at an accelerated speed.

2. In combination with a runway along which cans move at a relatively slow rate of speed and a positive can feed means operating at a relatively high rate of speed, can timing and accelerating means interposed therebetween, said means comprising a horizontally disposed rotary disc onto which the cans are deposited, a star wheel for separating and positively timing the cans with relation to each other, a plurality of radial accelerating arms movable in a horizontal plane and located above the rotary disc and adapted to engage the cans which are carried by the said disc and have been positively timed and are being advanced by the star wheel, and means acting upon said radial arms during the period of their engagement with the cans to cause the arms to gradually accelerate the speed of travel of the can engaged thereby and to increase its speed to that of the positive can feed means.

3. In combination with a runway along which cans move and a positive can feed mechanism, a can timing and accelerating device comprising a continuously rotating horizontally disposed disc, onto which the cans are deposited from the runway, guide means for defining an eccentric path of travel for the cans around and over the disc, a star wheel above the disc and moving in unison therewith to space and positively time the cans with relation to each other, a plurality of radial arms bodily moving along a circular path of travel above and eccentric to the axis of the disc whereby said arms may move into engagement with cans timed and being positively advanced by the star wheel and means whereby said arms while bodily moving along the circular path of travel may be independently and gradually swung to engage the timed cans and to accelerate their speed of travel from that of the disc upon which they rest to the positive feed means.

4. A device of the class described, comprising a rotary disc disposed in a horizontal plane and upon which cans may be deposited, a plurality of accelerating arms mounted to move bodily above the rotary disc in a circuitous path of travel around an axis other than the axis of the disc, guide rails extending over the disc to guide cans along the path of travel initially concentric

with the axis of the disc and finally concentric with the axis around which the accelerating arms move, means for individually operating said accelerating arms during the portion of their path of travel along the path of travel of the cans whereby they are gradually swung in advance of their mounting and will act to gradually accelerate the speed of the cans with which they are in register, and means moving in unison with the rotary disc for spacing and timing the cans with relation to each other.

5. A device of the class described, comprising a rotary disc disposed in a horizontal plane and upon which cans may be deposited, a plurality of accelerating arms mounted to move bodily above the rotary disc in a circular path of travel around an axis other than the axis of the disc, guide rails extending over the disc to guide cans along the path of travel initially eccentric with the axis of the disc and finally eccentric with the axis around which the accelerating arms move, means for individually operating said accelerating arms during the portion of their path of travel along the path of travel of the cans whereby they are gradually swung in advance of their mounting and will act to gradually accelerate the speed of the cans with which they are in register, means moving in unison with the rotary disc for spacing and timing the cans with relation to each other, said means comprising a star wheel formed with shallow teeth thereon, forward faces of said teeth being arcuate to conform to the contour of a can and the rear faces of said teeth being on a long gradual curve whereby the cans may gently roll along said face and register with the arcuate portion of the next succeeding tooth.

6. A device of the class described, comprising a rotary disc disposed in a horizontal plane and upon which cans may be deposited, a plurality of accelerating arms mounted to move bodily in a circular path of travel around an axis other than the axis of the disc, guide rails extending over the disc to guide cans along the path of travel initially eccentric with the axis of the disc and finally eccentric with the axis around which the accelerating arms move, means for individually operating said accelerating arms during the portion of their path of travel along the path of travel of the cans whereby they are gradually swung in advance of their mounting and will act to gradually accelerate the speed of the cans with which they are in register, means moving in unison with the rotary disc for spacing and timing the cans with relation to each other, said means comprising a star wheel formed with shallow teeth thereon, forward faces of said teeth being arcuate to conform to the contour of a can and the rear

faces of said teeth being on a long gradual
curve whereby the cans may gently roll
along said face and register with the arcu-
ate portion of the next succeeding tooth,
5 and yieldable means cooperating with the
star wheel to retard a can which is not in
register with the arcuate face of a tooth
and to permit the tooth to gradually move
along the can until the arcuate face of the
10 next succeeding tooth registers therewith.

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