July 10, 1934. C. HANSEN 1,966,387

COUNTER AND DIVERTER FOR CAN BODY MACHINES

Filed June 2, 1932 4 Sheets-Sheet 1

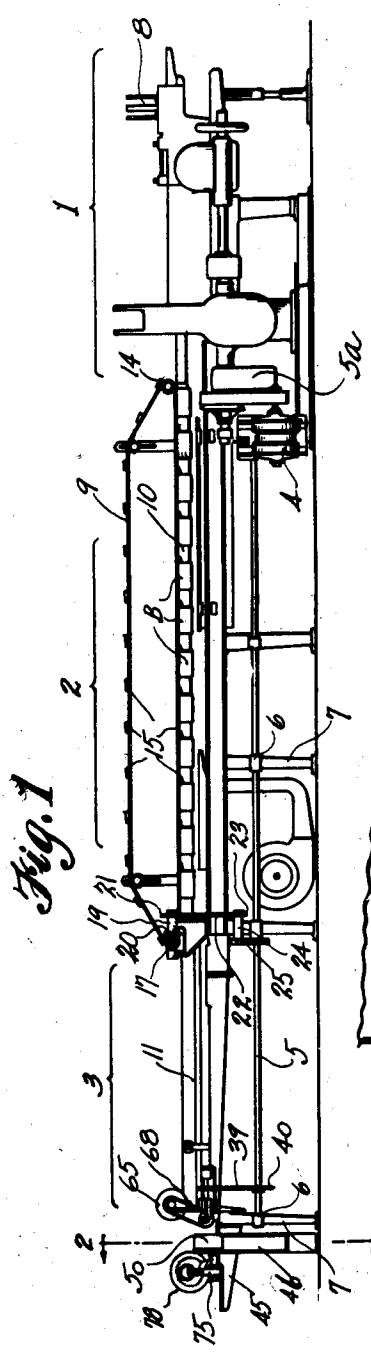


Fig. 1

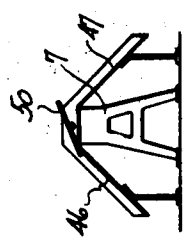


Fig. 2

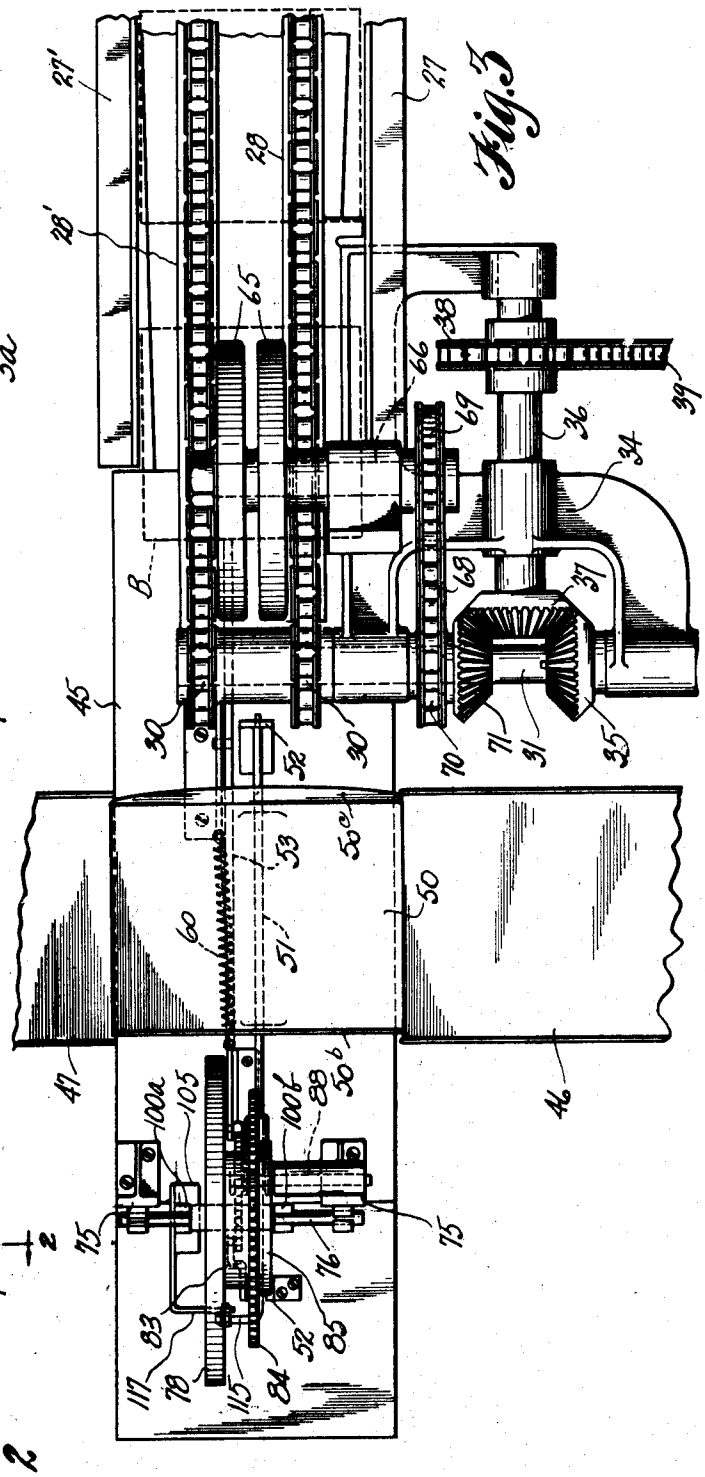


Fig. 3

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Filed June 2, 1932 4 Sheets-Sheet 2

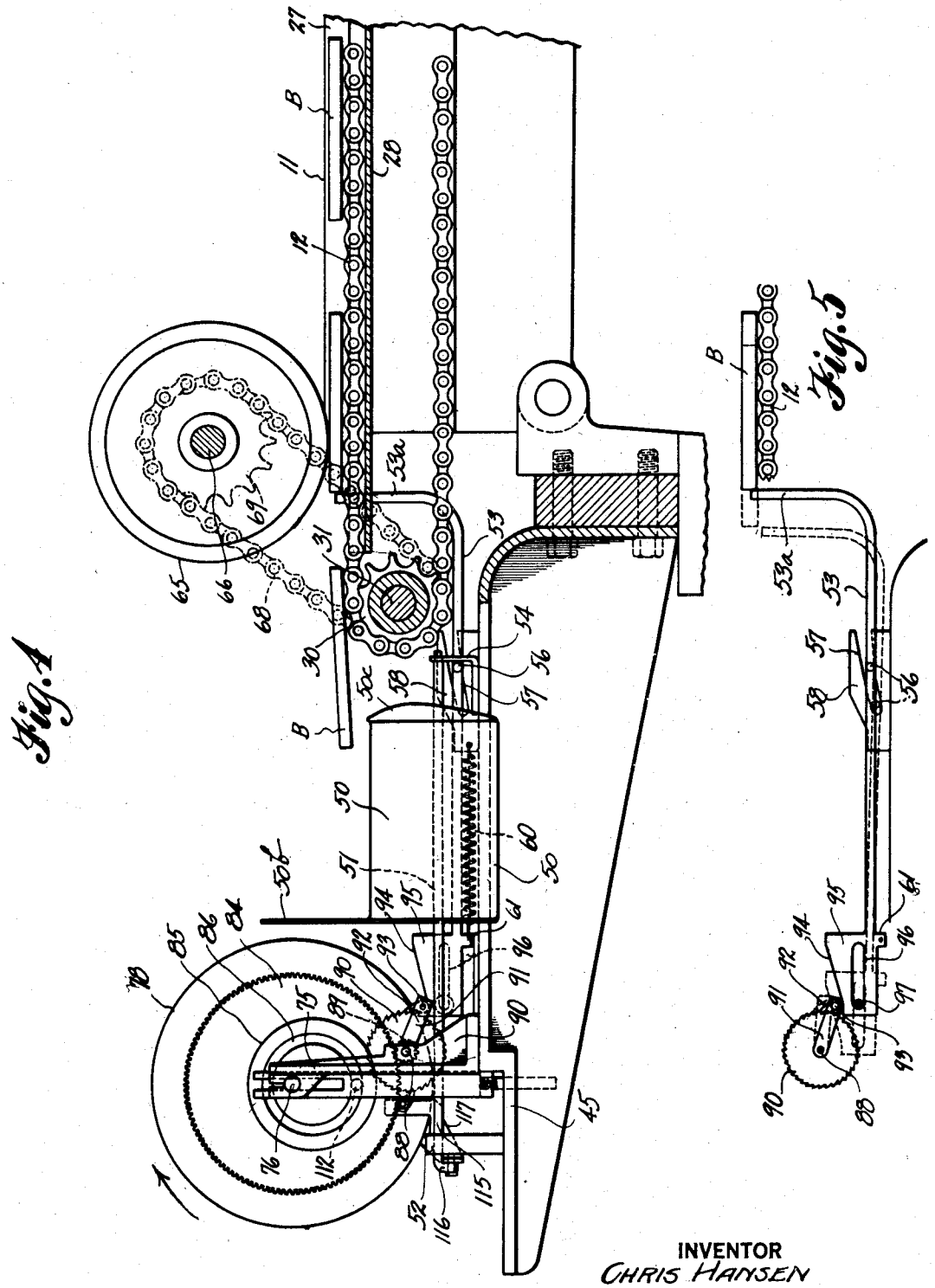


Fig. 4

Fig. 5

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COUNTER AND DIVERTER FOR CAN BODY MACHINES

Filed June 2, 1932 4 Sheets-Sheet 3

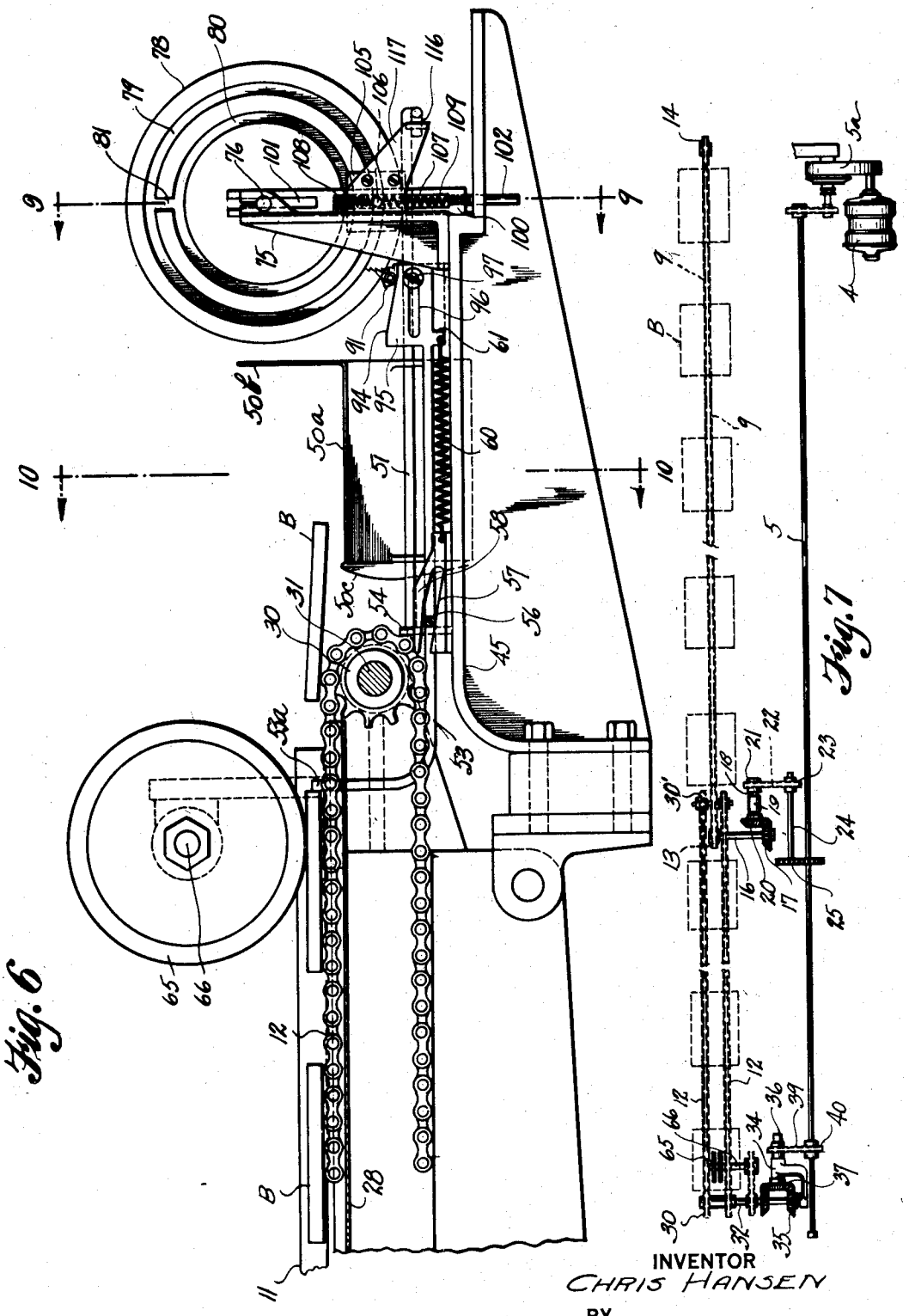


Fig. 6

Fig. 7

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July 10, 1934. C. HANSEN 1,966,387

COUNTER AND DIVERTER FOR CAN BODY MACHINES

Filed June 2, 1932 4 Sheets-Sheet 4

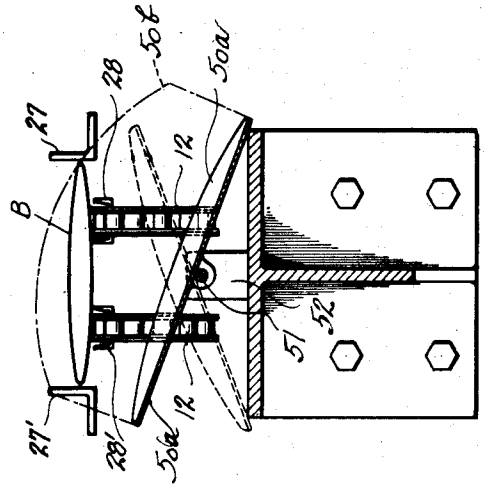


Fig. 10

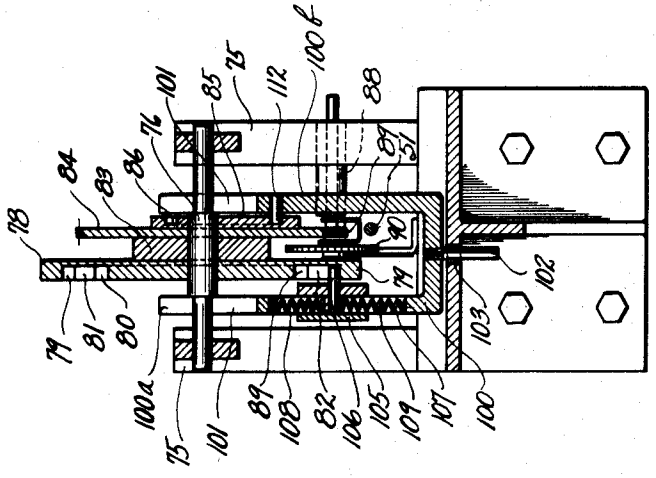


Fig. 9

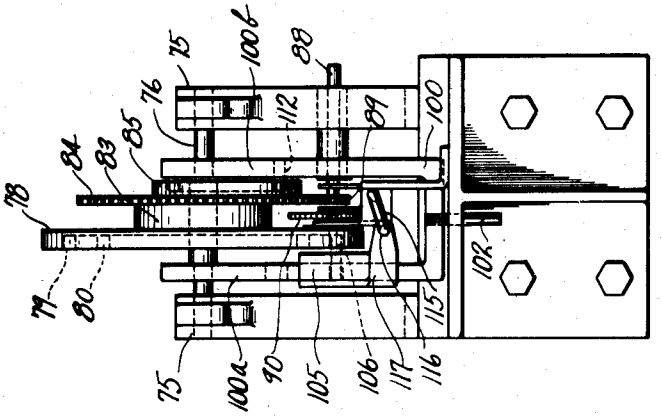


Fig. 8

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UNITED STATES PATENT OFFICE

1,966,387

COUNTER AND DIVERTER FOR CAN BODY MACHINES

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Application June 2, 1932, Serial No. 615,015

6 Claims. (Cl. 235—98)

This invention relates to automatic counting and diverting mechanism of a character whereby articles delivered from a traveling line may be counted and in predetermined numbers diverted from the line, alternately, into different receptacles.

More particularly, the present invention relates to an automatic mechanism of the above character designed for use in connection with can body makers, and it has for its principal object to provide a counter and diverter mechanism whereby a definite number of can bodies, as delivered from the machine, may be diverted into a packing chute at one side of the point of delivery, and then a like number be diverted into a packing chute at the other side.

It is also an object of this invention to provide a mechanism wherein the counting mechanism is actuated directly by the articles in the traveling line, as distinguished from being controlled by the machine or conveyer mechanism, and wherein the diverter device is directly under the control of the counter, thereby avoiding any error in the delivery of the cans into the different receptacles by reason of any absence of cans from the regular order of delivery.

More specifically stated, the present invention resides in the use of a pivoted diverter chute into which the can bodies from the machine are delivered, and a counter mechanism that is actuated by the bodies as delivered to this chute to move it, first to a position whereby a certain predetermined number of bodies will be directed into a packing chute at one side of the machine and then a like number directed into a packing chute at the other side; the diverter chute being open at its opposite ends and the bodies being delivered by gravity first from one end thereof and then from the other in accordance with its direction of inclination.

Other objects of the invention reside in the various details of construction, in the combination of parts and in their mode of operation, as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a side elevation of a body maker equipped with a counter and diverter mechanism embodying the present invention.

Fig. 2 is a cross sectional view on the line 2—2 in Fig. 1, illustrating the two packing chutes and the relative position of the diverter chute associated therewith.

Fig. 3 is an enlarged plan view of the delivery end of the body maker showing the counter and diverter as applied thereto.

Fig. 4 is a side elevation and partial sectional view of the mechanism of Fig. 3.

Fig. 5 is a detail, illustrating the movement of the counter actuating slide.

Fig. 6 is a side elevation of the counter and diverter as seen from the side opposite that shown in Fig. 4.

Fig. 7 is a plan view, diagrammatically showing the driving connections for the conveyer systems.

Fig. 8 is an end elevation of the counter and diverter mechanism.

Fig. 9 is a cross sectional view taken on the line 9—9 in Fig. 6.

Fig. 10 is a cross sectional view on the line 10—10 in Fig. 6.

Referring more in detail to the drawings—

Fig. 1 illustrates a can body maker of a type to which the present counter and diverter mechanism is applicable. This particular type of body maker is for the manufacture of flat can bodies, that is, can bodies that are made flat and subsequently are to be made into cylindrical form. It comprises the body machine proper, designated by reference numeral 1, the side seamer mechanism 2 and the cooler mechanism 3; these three mechanisms being associated together as a single machine and all are operated in synchronism from a common source of power, which as shown is an electric motor 4. A line shaft 5 is operatively connected with the motor through suitable transmission gearing designated at 5a, and extends in a direction lengthwise of the machine and is revolubly supported in bearings 6 attached to the supporting frames 7 of the cooler and side seamer.

On the body maker 1 is a hopper 8 within which can body blanks may be placed to be fed into the machine for forming into can bodies. In Figs. 1, 3, 4 and 10 the formed bodies are designated by reference character B. The bodies B as formed in the body machine 1, are taken up by a conveyer belt 9 and moved in regular spacing along horn 10 through the mechanism 2 where solder is applied to the side seam and they are finally delivered from the horn into a guideway 11 and onto a pair of conveyer chains 12—12 operating lengthwise of the guideway and whereby the bodies are carried to the counter and diverter mechanism at the end of the guideway.

As shown in Figs. 1 and 7, the conveyer chain belt 9 is operable at opposite ends of the horn 10 about sprocket wheels 13 and 14 with the lower run of the belt closely overlying the horn. The belt is provided at regular intervals with attachment links 15 in the form of pushers whereby the can bodies as delivered from the body machine and pushed in succession along the horn and across the solder roll are finally delivered into the guideway 11. The sprocket wheel 13, as observed best by reference to the diagrammatic view of Fig. 7, is mounted by a cross shaft 16 and this is equipped at one end with a driving bevel gear 17. A short shaft 18, parallel with the horn and mounted in a bearing 19, has a bevel gear 20 keyed thereon meshing with the gear 17, and it also has a sprocket wheel 21 keyed thereon and driven by a chain belt 22 operating about a sprocket wheel 23 keyed on a counter shaft 24. The counter shaft 24, in turn, is driven by a geared connection, as at 25, with the line shaft 5.

The guideway 11, as seen in Figs. 3 and 10, is formed by two parallel, spaced angle bars 27—27' between which the can bodies B are forwarded upon the upper runs of the pair of parallel conveyer belts 12—12; the upper runs of the belts being supported in guide channels 28—28' which serve as the base of the guideway. These belts, as seen in Fig. 7, operate about sprocket wheels 30—30' at opposite ends of the guideway. The sprocket wheels 30 are fixed on a cross shaft 31 driven from the shaft 5, as seen best in Fig. 3, wherein 34 designates a supporting bracket for the shaft 31 and 35 designates a bevelled driving gear keyed on the shaft. A counter shaft 36 is revolubly supported in the bracket parallel with the guideway and this shaft has a main bevel gear 37 meshing with the driving gear 35 and also has a sprocket wheel 38 keyed thereon and driven by a chain belt 39 operating about a sprocket wheel 40 fixed on the shaft 5. Thus it will be apparent that by use of gears of proper ratio, the two conveyer systems will be driven in synchronism and the can bodies advanced from the horn will be taken up and conveyed in spaced relation, as seen in Fig. 6, by the conveyer belts 12, and finally delivered therefrom to the counter and diverter mechanism.

The counter and diverter mechanism is mounted at the delivery end of the guideway 11 upon a supporting bracket 45 that is fixed to the end frame 7 which supports that end of the guideway. As observed by reference to Fig. 2, there are two packing chutes 46 and 47 at the delivery end of the guideway 11 into which the can bodies may be alternately diverted, and there is a diverter chute 50 arranged to receive the can bodies directly from the guideway 11 and to selectively divert them into one or the other of the packing chutes which extend downwardly and at right angles to the guideway. As seen best in Fig. 10, the diverter chute is disposed transversely of the direction of the delivery of the cans, and it is fixed intermediate its ends upon an actuating shaft 51 and this shaft is revolubly supported lengthwise of the direction of delivery of cans along the machine, on bearings 52—52 fixed upon the bracket 45. This diverter chute has a flat bottom wall 50*a*, a high outer side wall 50*b* against which the cans are delivered from the guideway 11, and a low opposite side wall 50*c* which is below the line of delivery. The opposite ends of the chute 50 are open and the cans received may be diverted into one or the other of the packing chutes 46 or 47 by tilting the chute 50 in that direction.

The tilting of this diverter chute is automatically controlled by rotative action of shaft 51 under control of a counter mechanism actuated by can bodies delivered along the guideway 11. The counter mechanism will best be understood by reference to Figs. 4, 5 and 6, wherein 53 designates a slide that is mounted upon the bracket 45 below the diverter chute for movement in supports in the direction of delivery of cans one of which is indicated at 54. This slide 53, as seen in Fig. 5, has an upturned leg 53*a* at what will be termed its forward end. This leg extends upwardly between the conveyer chains 12—12 and into the path of delivery of can bodies B so that each body delivered along the guideway 11 will engage therewith and push the slide rearwardly, as from the full line position of Fig. 5 to the dotted line position. Fixed in the slide is a cross pin 56 movable in a slot 57 fixed in a plate 58 that is fixed in an upright position on bracket 45. The slot is downwardly and rearwardly inclined so that as the slide 53 is pushed rearwardly by a can delivered along the guideway 11 and engaging the end 53*a*, the engaged end of the slide will be caused to move downwardly, thereby to release the upturned end from the can. When the slide is thus released, it is pulled forwardly, back to initial position by a coiled spring 60 which is attached at one end to the fixed plate 58 and at its other end to a depending lug 61 on the rearward end of the slide.

In order that the cans will positively actuate this slide when they engage the end 53*a*, it is necessary to hold them against slippage on the conveyer chains 12—12 and for this purpose I provide a pair of rubber covered pressure rollers 65—65 overlying the guideway, as in Figs. 3 and 4, to press downwardly on the can bodies as they engage with and pass over the upturned leg of the slide. These rolls are fixed on a supporting cross shaft 66 revoluble in the bracket 34 and the shaft is driven to cause the rollers to rotate in accordance with the forward movement of the cans. The means for driving the shaft 66 as seen in Fig. 3, consists of a sprocket chain belt 68 that operates about a sprocket wheel 69 on shaft 66 and a sprocket wheel 70 on the hub of a bevel gear 71 revoluble on shaft 31 and in driving mesh with gear 37.

Fixed on the bracket 45, in spaced relation, are standards 75—75 which mount a cross shaft 76 between them, as seen best in Fig. 9. Revoluble on this shaft is a wheel 78 provided in one face, as seen in Fig. 6, with two spaced circular grooves 79 and 80 concentric of the wheel and connected at diametrically opposite points by grooves 81 and 82, extending in a direction radially of the wheel. Fixed to the other face of the wheel 78, but spaced therefrom by a washer 83, is a gear wheel 84, and at the outside of this gear is a cam disk 85 eccentrically mounted and provided with a circular groove 86 eccentric of the shaft. The shaft in this instance is stationary while wheel 78, washer 83, gear 84 and disk 85 are fixed together and rotate on the shaft. The disk 85 is so arranged relative to wheel 78 that the point in the circular groove 86 that is farthest from the axis of rotation, and the point closest to this axis, are alined with the slots 81 and 82 which connect the grooves 79 and 80 in the wheel 78.

Mounted in standards 75—75 below the gear wheel, is a cross shaft 88 on which a small pinion 89 is fixed to rotate the large gear 84. Also fixed on shaft 88 is a ratchet wheel 90. A pawl bracket

91 pivots on the shaft and this is provided at its outer end with a spring pressed pawl 92 engaging the ratchet. Also, on the pawl bracket is a stud 93 resting upon an inclined cam surface 94 of a cam plate 95 fixed to the rearward end of the slide 53. This plate has a horizontal slot 96 through which a supporting pin 97 extends. Thus, when the slide 53 is actuated rearwardly by the contacting of a can body with the upturned leg at its forward end, the cam plate 95 actuates the pawl bracket 91 upwardly and the pawl 92 engages and rotates the ratchet 90 a distance of one tooth. The gear 84 in the present instance has one hundred sixty teeth. The gear 89 has sixteen teeth while the ratchet has thirty six teeth. Thus, the large gear 84, wheel 78 and disk 85 will make one complete revolution in unison for every three hundred sixtieth reciprocal action of the slide; that is, for every three hundred sixty can bodies delivered.

Mounted vertically between the standards 75—75, is a U-shaped yoke 100, the legs 100*a* and 100*b* of which are disposed at opposite sides of the gear and wheels on the cross shaft 76 and are longitudinally slotted, as at 101, at their upper ends to receive the cross shaft. Fixed in the base of the yoke is a guide pin 102 extending slidably within a hole 103 in the mounting bracket 45. There is also a block 105 slidably fitted on the leg 100*a* of the yoke and a stud 106 extends through the block and also through a longitudinal slot 107 in the yoke leg and coiled springs 108 and 109 are disposed in this slot at opposite sides of the stud to bear oppositely thereagainst. The outer end of this stud is arranged for travel in the circular slots 79 and 80 of wheel 78 as will be observed in Fig. 9.

By reference to Fig. 9, it will be observed also that a stud 112 extends inwardly from the leg 100*b* of yoke 100 and follows in the circular groove 86 of the disk 85 fixed eccentrically of wheel 78. Thus, when the disk is rotated, the yoke is caused to move upwardly and downwardly accordingly.

The movement of the diverter chute from a position to deliver cans into one packing chute and then into the other, is under control of the pivot shaft 51 by which the chute is mounted. This shaft, at its forward end, has a laterally directed crank arm 115 connected pivotally at its outer end, as at 116, to a bracket 117 fixed to the block 105 slidable on the yoke leg 100*a*. If the block moves upwardly, the shaft 51 is rotated to tilt the chute 50 to divert cans into packing chute 47. If the block moves downwardly, it rotates the shaft in an opposite direction, thus to divert the cans into the chute 46.

Movement of the block 105 from one position to the other is the effect of unequal pressure of springs 108—109 bearing thereagainst when the groove 81 or 82 in wheel 78 is brought into position to permit the stud 106 to move from one to the other of the circular grooves 79 and 80, and a difference in pressure of the springs is the result of the vertical movement of yoke 100 caused by travel of stud 112 in the eccentric groove 86 of disk 85 as the latter rotates.

Assuming the parts to be so constructed, and assembled, operation will be as follows:

With cans being delivered in regular order from the body machine 1, they will be taken up by the lower run of the conveyer chain belt 9 and delivered along the horn 10 across the soldering means and finally delivered into the guideway 11.

The conveyer chains 12—12, operating in the guideway 11, carry these can bodies, in spaced relation, to the counting and diverting mechanism. As the can bodies successively pass beneath the pressure rolls 65 they are brought into contact with the upturned end 53*a* of the slide 53 and push the slide rearwardly against the holding tension of the spring 60. As the slide 53 moves rearwardly, the inclined cam surface 94 of the cam plate 95 actuates the pawl bracket 91 upwardly and the pawl 92 engages the ratchet wheel 90 to rotate it an interval of one tooth. As the slide 53 moves rearwardly the pin 56, through its forward end portion, moves within the downward inclined slot 57 of the plate 58 and thereby pulls the upturned end of the slide downwardly to disengage it from the can body. The spring 60 then immediately returns the slide to initial position, ready for contact by the next oncoming can body.

Successive operation of the slide thus rotates the ratchet 90 and, through the gearing mechanism provided, rotates the large wheel 78 and the eccentric disk 85. Assuming that at the start of an operation, the parts are in the position shown in Fig. 9, with the stud 106 of the block 105 disposed within the outer circular slot 79 in the wheel 78 and the disk 85 in a position whereby the yoke is moved to its lowered position. Then by reason of successive operations of the slide, the wheel 78 and eccentric disk will be rotated in the direction of the arrow in Fig. 4, and the stud 112 following in the groove 86 in the disk 85 will cause the yoke to be moved upwardly, but since the stud 106 is then contained within the groove 79, the block 105 cannot move upwardly and therefore the spring 109 will be placed under compression. When the wheel 78 has finally been rotated through an arc of one hundred eighty degrees, it will bring the connecting slot 81 into alinement with the stud 106 and the spring 109 will then actuate the block 105 upwardly and the stud 106 will pass into the inner circular groove 80. This upward movement of the block, through the bracket 117 and crank arm 115 of the shaft 81 will cause the latter to be rotated in such manner as to tilt the diverter chute from its dotted line position of Fig. 10 to the full line position, thereby to divert the cans received therein from chute 46 into chute 47.

As the wheel 78 and eccentric disk 85 continue to revolve, the yoke 100 will then be moved downwardly to place the spring 108 under compression. The block 105 however, is now retained in its upper position by reason of the stud 106 being confined within the slot 80. However, after rotation of the wheel 78 through one half turn, the stud 106 is brought into alinement with the other connecting passage 81 and the spring 108 moves the stud through this passage back into the outer slot 79. This movement of the block returns the diverter chute to its initial position and the cans received will be diverted into the other packing chute.

By properly proportioning the gears, or movement of the ratchet, the device may be made to operate to divert any desired number of cans into one chute before it changes to divert into the other.

While it is not essential that the grooves 79 and 80 continue through a full circle, this is desirable to prevent possible damage in the event the block would for any reason not be actuated at the proper time.

While the invention is described as in a can

body machine, it will be understood that it may be used with any type of machine for producing cans or metal parts to be used therewith where it is desired to count and separately group a predetermined number of parts.

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

1. A counting and diverting mechanism for conveyed articles comprising a conveyor having means for positively moving the articles in a line, packing chutes on opposite sides of the line of travel for receiving the articles, a movable diverter disposed so as to receive the articles from the conveyor, a spring for shifting the diverter in one direction and a spring for shifting it in the other direction, means for storing power alternately in said springs for operating the diverter, and a control means for restraining the movement of the diverter operated by the passing articles and effective to release the spring in which power has been stored for action when a predetermined number of articles have passed into a packing chute.

2. A counting and diverting mechanism for conveyed articles comprising a conveyor having means for positively moving the articles in a line, packing chutes on opposite sides of the line of travel for receiving the articles, a movable diverter disposed so as to receive the articles from the conveyor, a spring for shifting said diverter in one direction and a spring for shifting it in the other direction, a rotating member operated by the passing articles for storing power, first in one spring and then the other, and a control means for restraining the movement of the diverter operated by the passing articles and effective to release the spring in which power has been stored for action when a predetermined number of articles have passed into a packing chute.

3. A counting and diverting mechanism for conveyed articles comprising a conveyor having means for positively moving the articles in a line, packing chutes on opposite sides of the line of travel for receiving the articles, a movable diverter disposed so as to receive the articles from the conveyor, a spring for shifting the diverter in one direction and a spring for shifting it in the other direction, means for storing power alternately in said springs for operating the diverter, a member attached to the diverter operated upon alternately by said springs, a rotating disk, concentric grooves therein spaced from each other, and a radial groove connecting the same, a pin carried by said member and extending into the grooves, said disk operating to restrain the movement of said member when power is stored in the spring for operating the same until the disk is turned to present the radial groove to the pin, whereupon said pin shifts to the other concentric groove and the spring shifts the diverter.

4. A counting and diverting mechanism for conveyed articles comprising a conveyor having means for positively moving the articles in a line, packing chutes on opposite sides of the line of travel for receiving the articles, a movable diverter disposed so as to receive the articles from the conveyor, a spring for shifting said diverter in one direction and a spring for shifting it in the other direction, a rotating member operated by the passing articles for storing power, first in one spring and then the other, a member attached to the diverter operated upon alternately by said springs, a rotating disk, concentric grooves therein spaced from each other, and a radial groove connecting the same, a pin carried by said member and extending into the grooves, said disk operating to restrain the movement of said member when power is stored in the spring for operating the same until the disk is turned to present the radial groove to the pin, whereupon said pin shifts to the other concentric groove and the spring shifts the diverter.

5. A counting and diverting mechanism for conveyed articles comprising a conveyor having means for positively moving the articles in a line, packing chutes on opposite sides of the line of travel for receiving the articles, a movable diverter disposed so as to receive the articles from the conveyor, a movable member connected to said diverter for shifting the same, a compression spring at each side of said member, and contacting therewith, a yoke associated with said springs and shiftable for storing power first in one spring and then the other, a rotating shaft connected to the yoke for shifting the same first in one direction and then the other, and control means operated by the passing articles for restraining the movement of said member when power is stored in said spring and effective to release the member for action when a predetermined number of articles have passed into the packing chute.

6. A counting and diverting mechanism for conveyed articles comprising a conveyor having means for positively moving the articles in a line, packing chutes on opposite sides of the line of travel for receiving the articles, a movable diverter disposed so as to receive the articles from the conveyor, a movable member connected to said diverter for shifting the same, a compression spring at each side of said member and contacting therewith, a yoke associated with said springs and shiftable for storing power first in one spring and then the other, a rotating shaft connected to the yoke for shifting the same first in one direction and then the other, a control disk operated by the passing articles and having two spaced concentric grooves therein, a radial groove connecting said concentric grooves, a pin attached to said member and running in said grooves, said disk restraining the movement of the member when power is stored in said spring until the radial groove permits the pin to shift to the other concentric groove, and means operated by the passing articles for actuating said disk.

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