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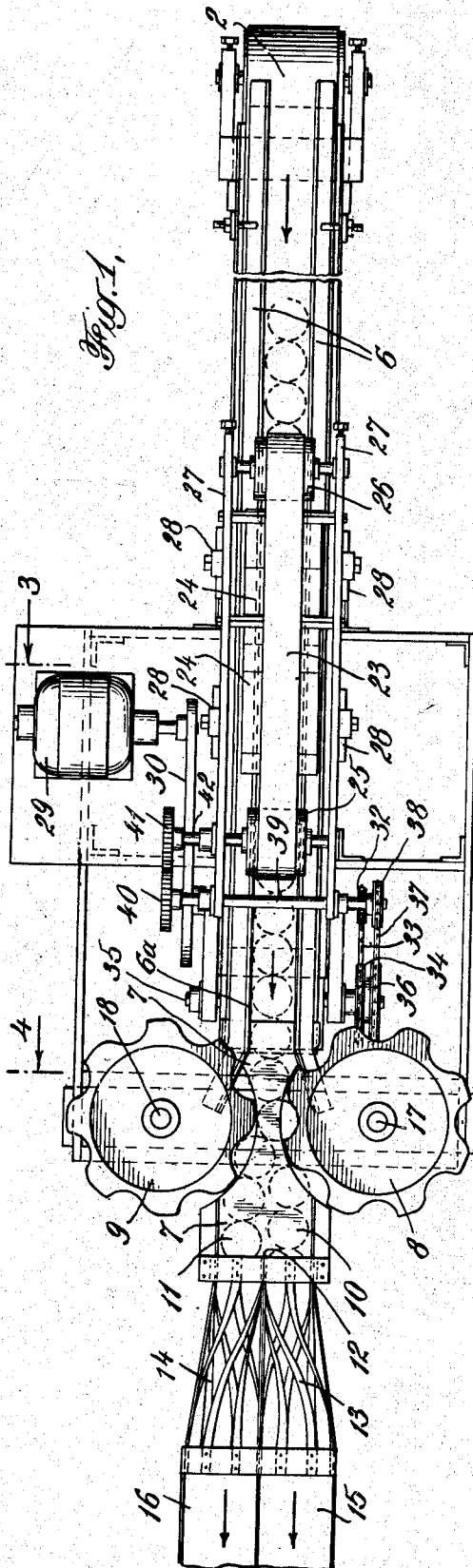
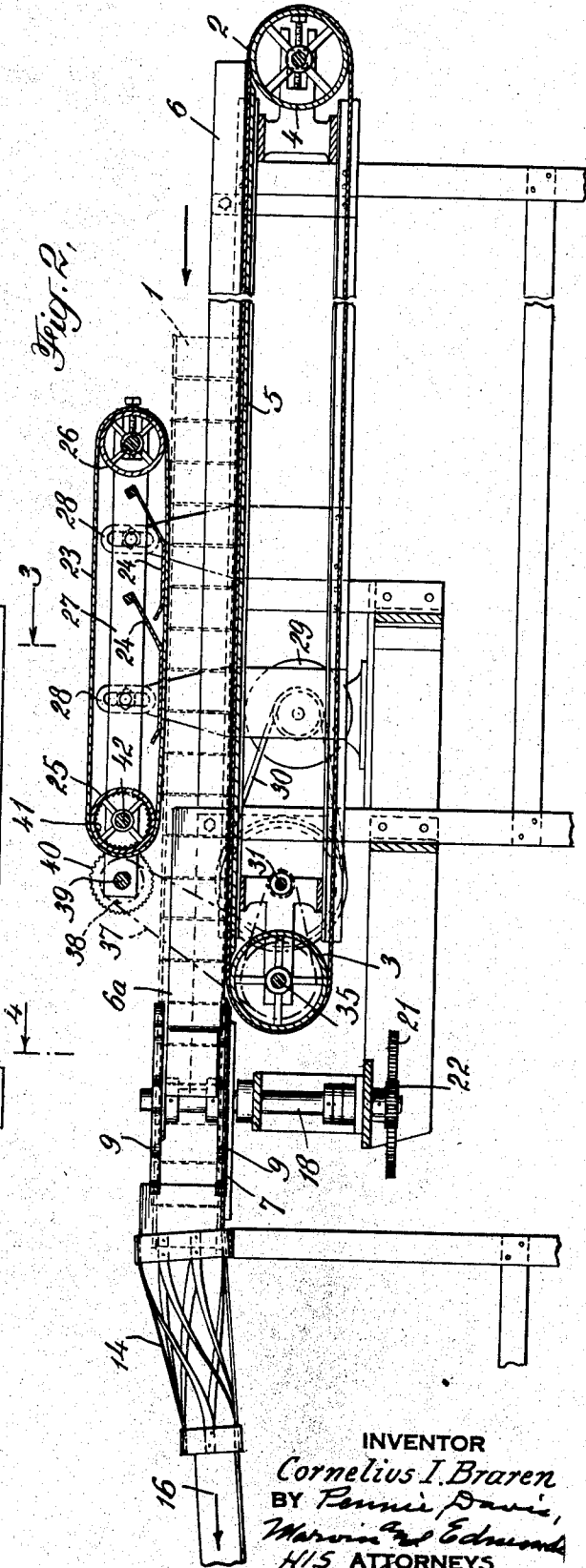
C. I. BRAREN

2,273,509

CAN-ARRANGING MACHINE

Filed April 12, 1939

7 Sheets-Sheet 1



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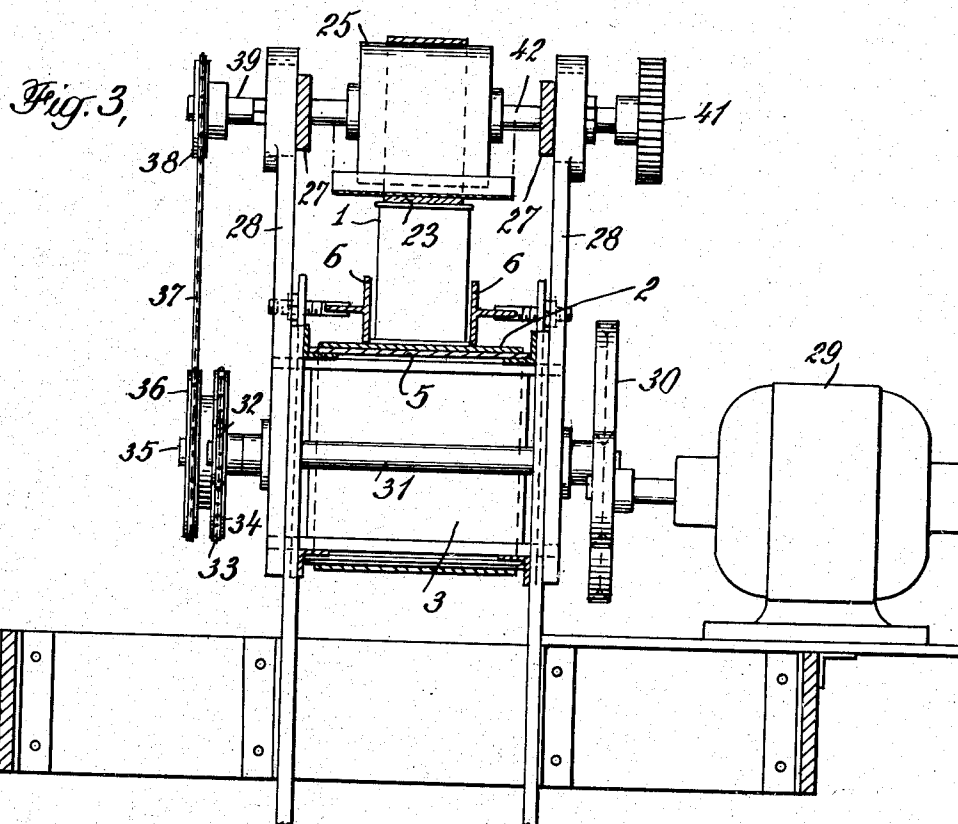
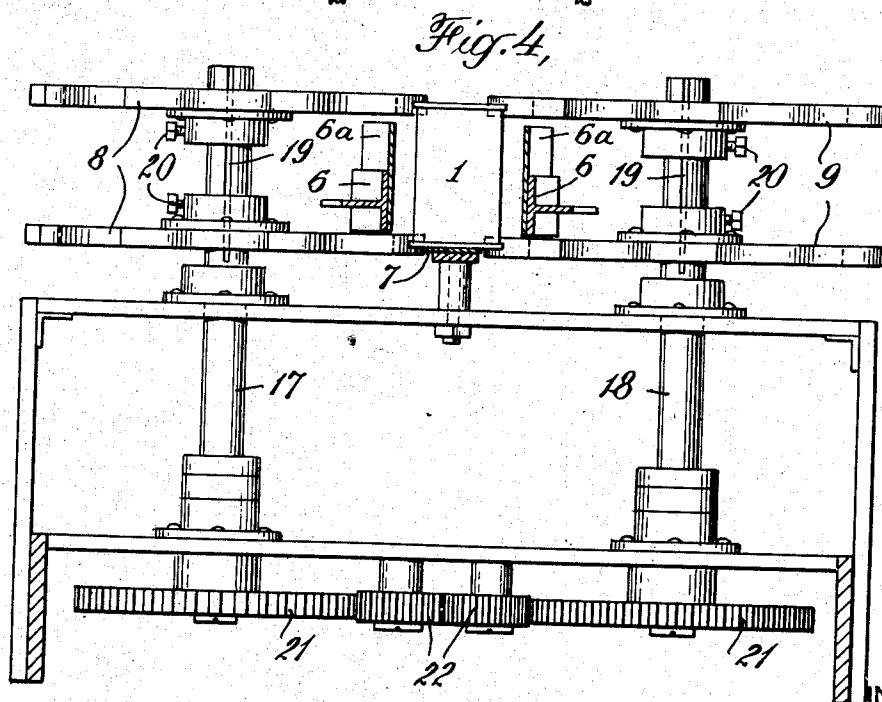
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CAN-ARRANGING MACHINE

Filed April 12, 1939

7 Sheets-Sheet 2



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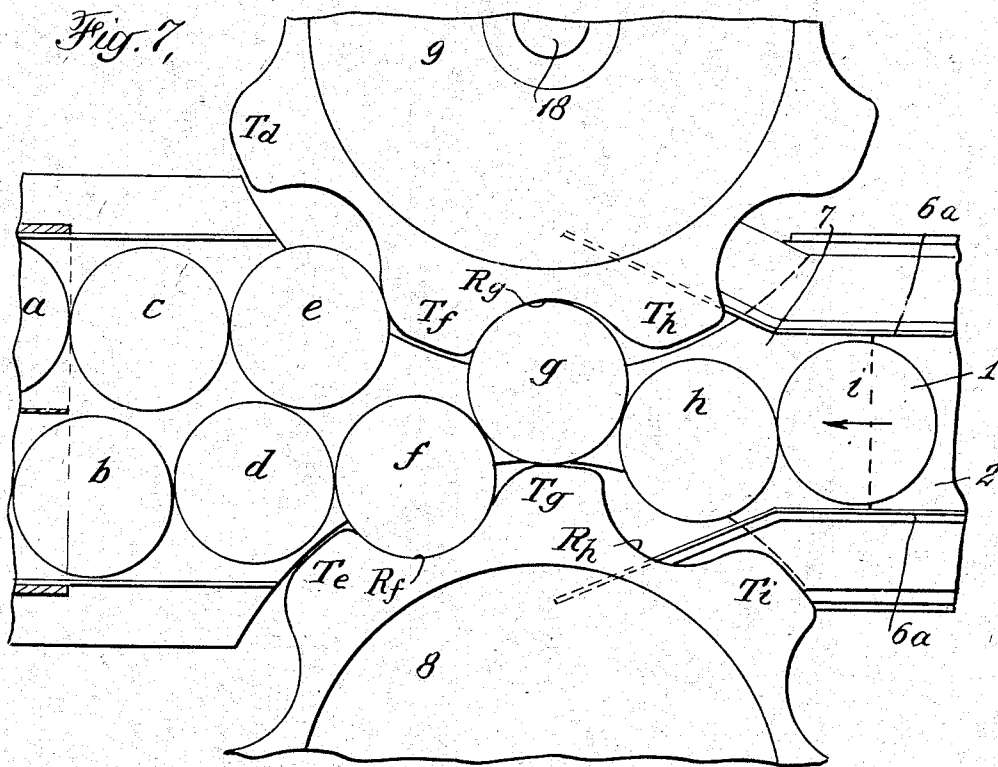
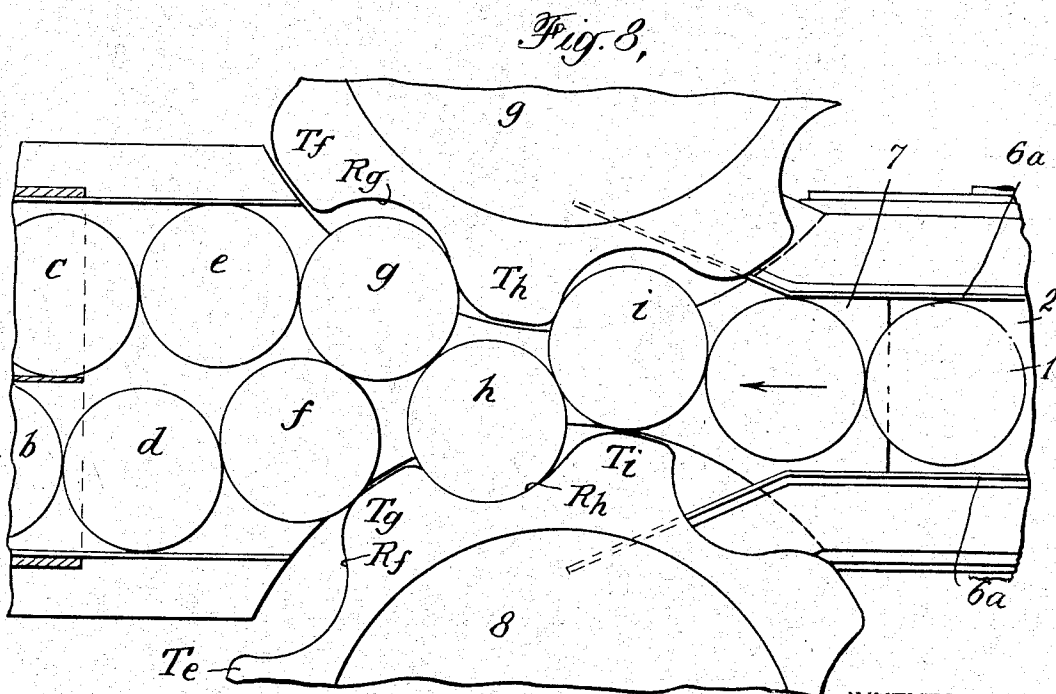
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CAN-ARRANGING MACHINE

Filed April 12, 1939

7 Sheets-Sheet 4



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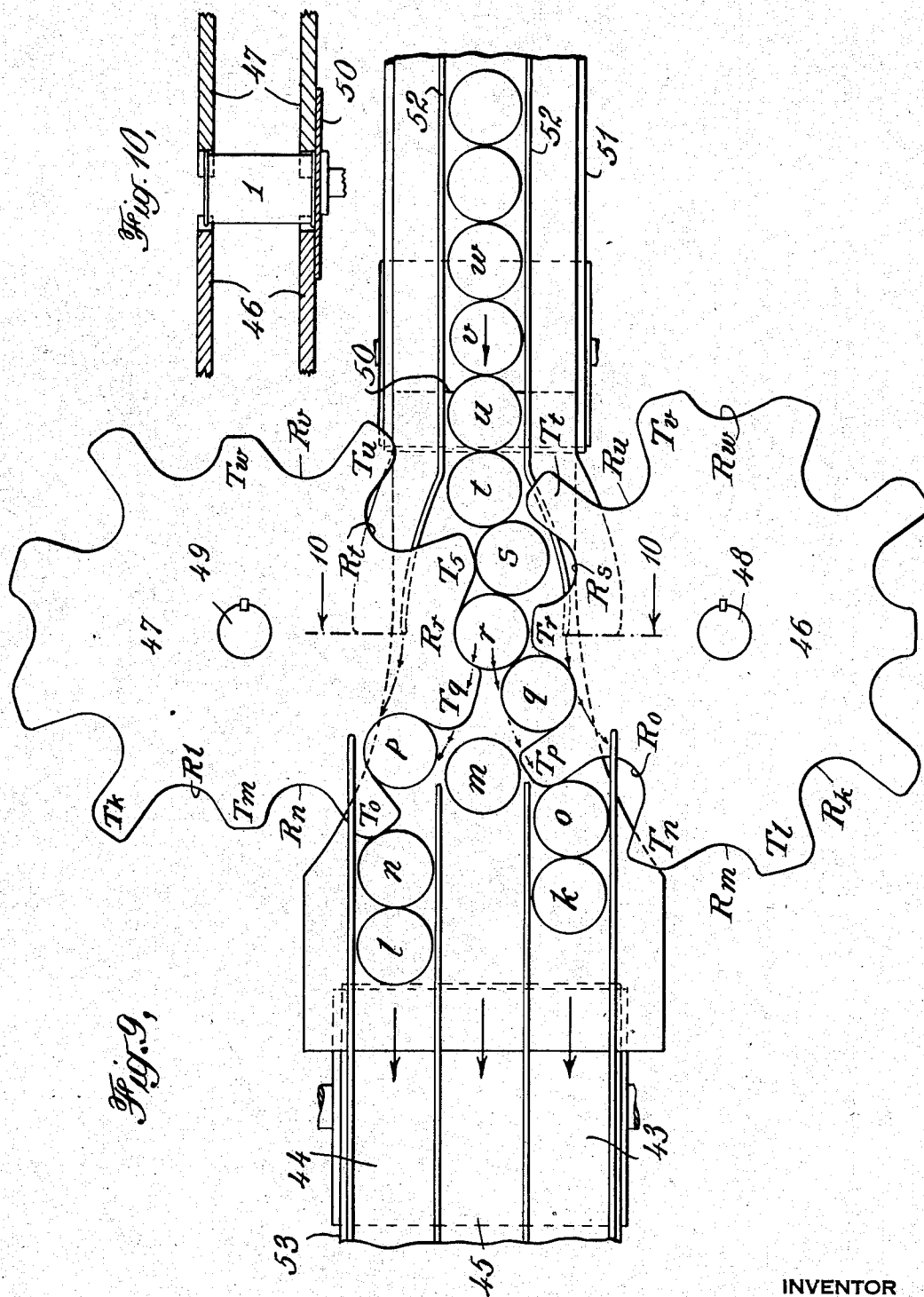
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CAN-ARRANGING MACHINE

Filed April 12, 1939

7 Sheets-Sheet 5



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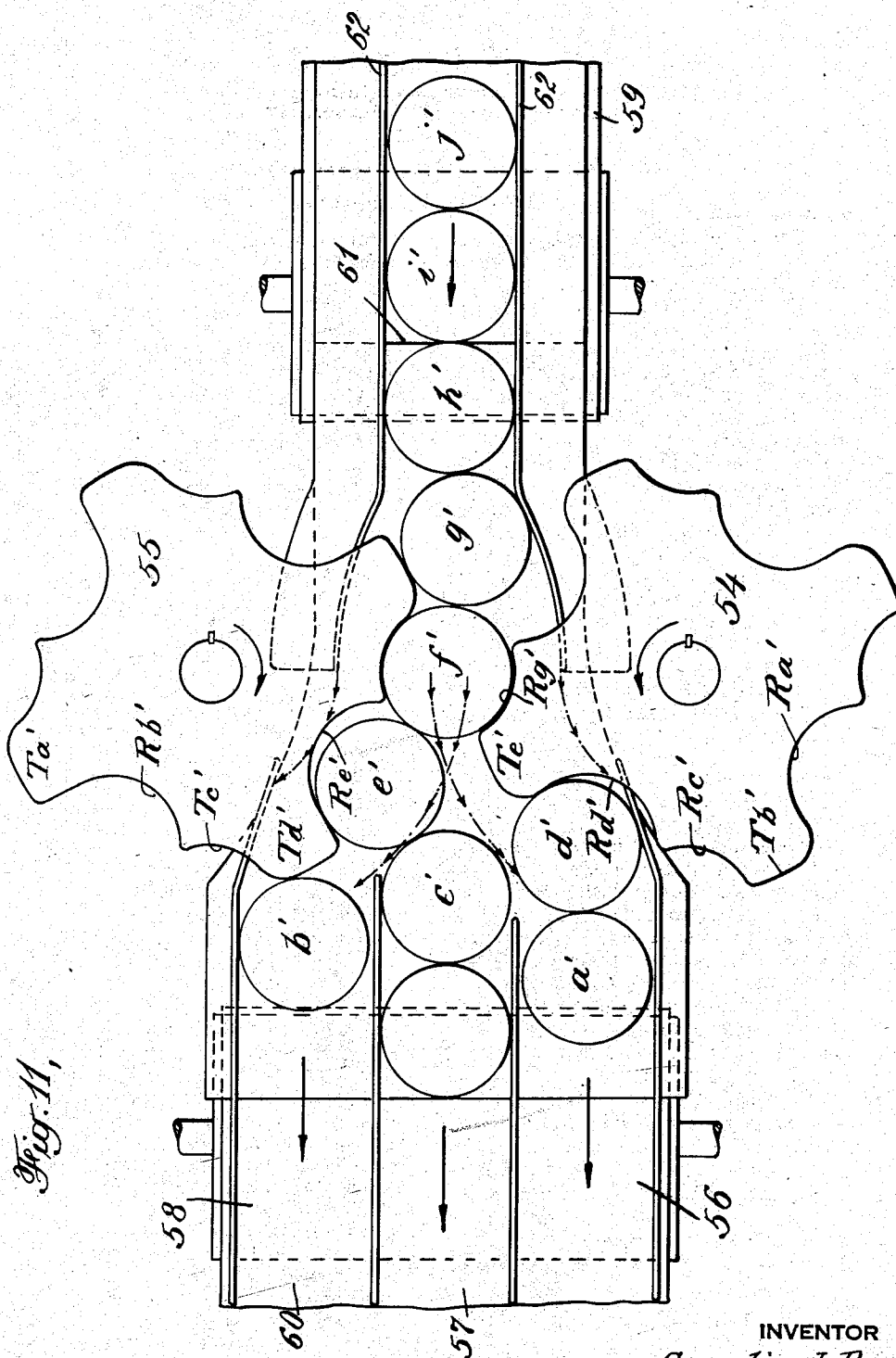
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CAN-ARRANGING MACHINE

Filed April 12, 1939

7 Sheets-Sheet 6



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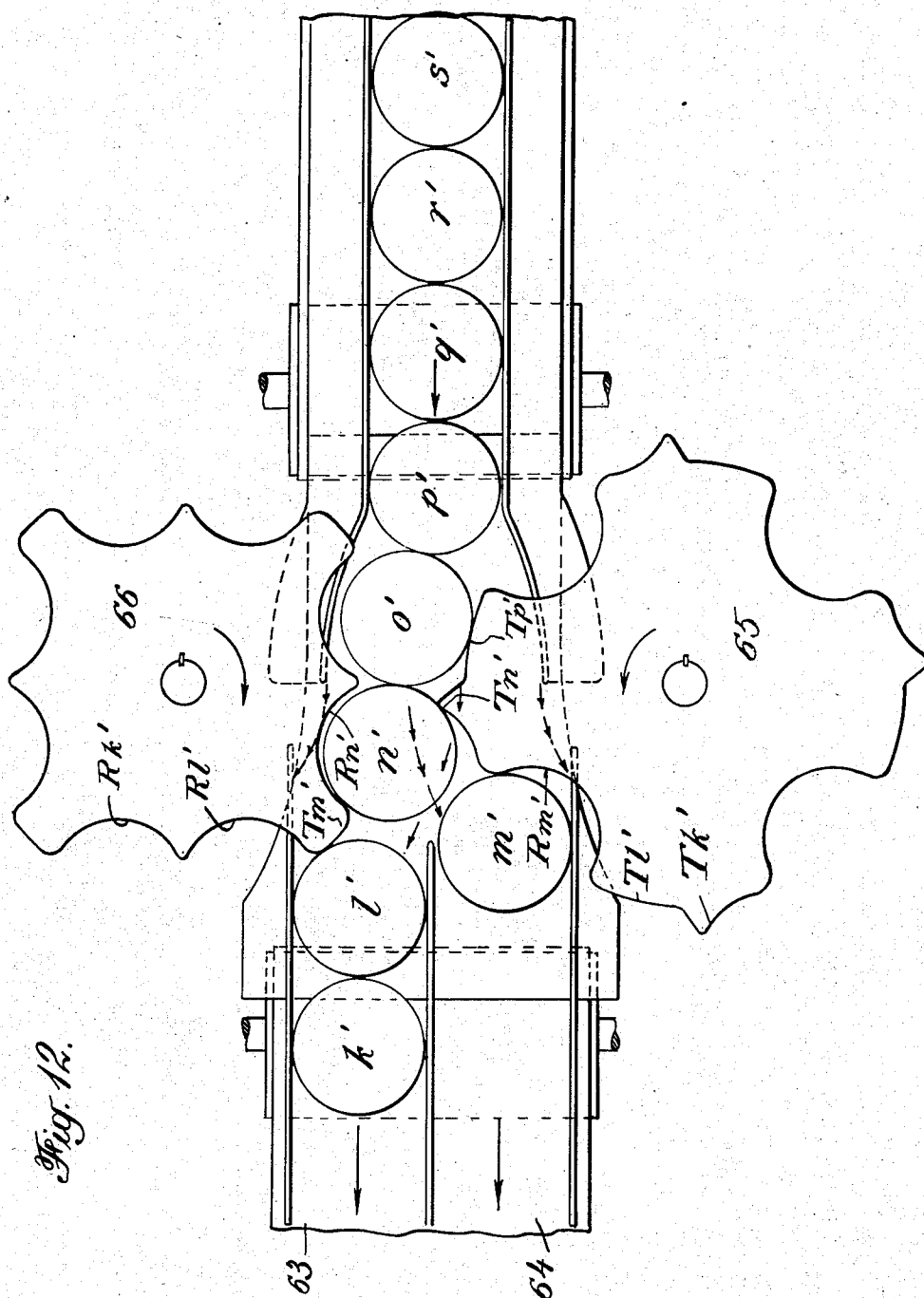
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CAN-ARRANGING MACHINE

Filed April 12, 1939

7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

2,273,509

CAN-ARRANGING MACHINE

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Application April 12, 1939, Serial No. 267,425

13 Claims. (Cl. 198—31)

This invention relates to an improved apparatus for arranging cans, and more particularly for rearranging cans which are being fed in upright position in a single line into two or more lines containing the same or different numbers of cans.

Such apparatus is employed for handling either filled or empty cans, and more especially, for handling cans in packing plants in which the cans have been filled with food or other products. In packing plants for packing fruit, vegetables and other products in cans, the cans usually pass from the labelling machines to the casing machines which place the labelled cans in shipping cases or cartons each containing the desired number of cans for shipment. These labelling machines operate at considerably higher speed than the casing machines so that one labelling machine can supply several casing machines. Not infrequently the cans are discharged from the labelling machine at a high rate of speed, for example, one thousand cans per minute in a single line, and it may be necessary to divide this line into four lines of 250 cans per minute, each, to be fed to four casing machines.

Heretofore it has been customary to employ dividing mechanism of the so-called "star wheel divider" type in which a divider element is shifted from side to side by the passing cans to switch the cans alternately into two runways or lines. This apparatus operates very satisfactorily when the speed of the cans is not too high, but at the higher can speeds, and particularly with the smaller sizes of cans, there is a tendency for the tongue of the dividing element to be prevented from shifting by engagement with the next succeeding can, thus causing the apparatus to fail to discharge the cans equally into the two runways or lines.

The object of the present invention is to overcome this difficulty and provide for the division of a single line of cans fed at high speed into two or more lines with a predetermined equal or unequal distribution of cans between these lines.

Another object of the invention is to provide an apparatus of this sort which is sufficiently rugged to withstand the passage therethrough of comparatively heavy cans at the high linear speed which is necessary with the high rate of can delivery desired.

The invention will be understood from a consideration of the accompanying drawings which illustrate by way of example two embodiments of the invention. In these drawings:

Fig. 1 is a plan view of the can-dividing apparatus;

Fig. 2 is a longitudinal vertical central section of the apparatus shown in Fig. 1;

Fig. 3 is a transverse vertical section taken on line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 3 taken on line 4—4 of Fig. 1;

Figs. 5-8, inclusive, are views illustrating the operation of the apparatus in rearranging the cans from a single line into two parallel lines;

Fig. 9 is a view similar to Figs. 5-8, inclusive of a modified form of the apparatus;

Fig. 10 is a fragmentary transverse vertical section taken on line 10—10 of Fig. 9;

Fig. 11 is a view similar to Fig. 9 of another modification, and;

Fig. 12 is a similar view of a further modification.

Referring now to these drawings, a single line of cans 1 is conveyed from the labelling machine by means of any suitable conveyor and delivered in upright position to the right hand end of an endless belt 2 which operates upon two rolls 3 and 4, the latter roll being adjustable to keep the belt taut. The upper side of the belt, which acts as a conveyor for the cans, is preferably supported upon a longitudinal shelf, or table, 5.

Along each margin of this belt 2 there are stationary guide rails 6 which are preferably adjustable laterally to accommodate different sizes of cans. These guide rails 6 are of sufficient vertical width to prevent the cans from tipping over under any unusual condition, but are arranged close to the surface of belt 2 so as to guide the cans by engaging the lower can beads, as illustrated in Fig. 3, and thereby avoid marring the labels.

Leaving the left-hand end of belt 2, the cans pass over a scuff plate 7, upon which they are supported in passing between two toothed wheels or, more properly, disks 8 and 9, by means of which, together with the lateral forces due to the interaction of the cans one upon another, the cans are rearranged into two rows 10 and 11. Just before the cans pass off the left-hand end of scuff plate 7, they pass the front end of a vertical division plate 12, and after that each of the separate lines 10 and 11 may, while still in upright position be passed through another can-dividing apparatus similar to that just described, thereby again rearranging these two rows into four rows, or lines, of cans to go to the casing machines.

As shown in Fig. 1, the cans of rows 10 and 11 are delivered to twisting devices 13 and 14, by means of which they are turned from upright

to horizontal position. Then the cans pass into inclined conveyor chutes 15 and 16 which serve to convey the cans rolling on their sides to two casing machines, for example.

Each of the toothed disks 8 and 9 comprises a lower section and an upper section, as illustrated in Figs. 2 and 4. For the sake of simplicity, however, these lower and upper sections will be referred to as one disk after the description of the details of construction is completed. The lower sections of these wheels act upon the bottom beads of the cans, and the upper sections on the top beads in order to avoid damage to the appearance of the cans.

Wheels or disks 8 and 9 are mounted, respectively, upon two vertical parallel shafts 17 and 18 and are keyed thereto by means of keys 19 so that the teeth and recesses of the upper and lower wheel sections are maintained accurately in vertical alinement. While the wheel sections are of sufficient width to accommodate cans of slightly varying height without readjustment, the sections are made vertically adjustable with respect to one another on their respective shafts 17 and 18 by means of the set screws 20 to enable the apparatus to handle cans of different heights as well as different diameters. It will be understood that when the apparatus is changed over to handle cans of considerably larger or smaller diameter, the wheels 8 and 9 will be replaced on shaft 17 and 18 by other similar wheels having the appropriate size of teeth and recesses.

In order to cause the teeth and recesses of wheels 8 and 9 to properly cooperate with each other to shift the cans as desired as the cans pass between these wheels, shafts 17 and 18 are geared together as illustrated, for example, in Fig. 4 in such manner that the wheels will rotate simultaneously in opposite directions and at the same angular velocity. As shown in Fig. 4, spur gearing may be employed for this purpose, including the two large gears 21 and the two smaller gears 22 intermeshing with one another to form a gear train connecting the two shafts. The wheels 8 and 9 thus rotate in unison as the cans are pushed between them.

It will be understood that wheels 8 and 9 are spaced apart an appropriate distance to permit the cans to move freely between them nested on one side in a wheel recess and held therein by a tooth on the opposite wheel as the cans cross the common center line of the wheels.

In order to support the cans so that the lower beads strike at about the centers of the lower wheel sections, scuff plate 7 is arcuately recessed on opposite sides, as shown in Fig. 1, to conform closely to the peripheries of wheels 8 and 9. Wheels 8 and 9 are not positively driven but are rotated solely by the feeding pressure of the cans in the single line. The portion of the single line 1 of cans which is undergoing separation consists of the cans on scuff plate 7. The first can on the scuff plate might be considered as constituting the rear end of the line of cans which is undergoing separation or division, in this instance, into two parallel lines. The feeding pressure for feeding these cans forward is applied at the rear end of this line by the cans which are on conveyor belt 2 and which are fed forward by the friction of the cans on this belt.

In order to provide sufficient feeding pressure at the rear end of the line of cans on the scuff plate 7 without making belt 2 too long, it is desirable to employ a comparatively short upper feed belt 23, the lower side of which is held in

contact with the tops of the cans by means of springs 24, and which is positively driven at the same linear speed as belt 2.

Auxiliary belt 23 is supported by means of pulleys 25 and 26 which are journaled in a framework 27 which is adjustable vertically, as indicated at 28 in Fig. 2.

Power for driving the entire machine is supplied by an electric motor 29 which is mounted at one side of the machine on a suitable platform which forms part of the machine framework. This motor, by means of a V-belt 30 drives a cross shaft 31, upon the opposite end of which there is a sprocket 32. Conveyor belt 2 is driven by means of a chain 33 passing over sprocket 32 and a larger sprocket 34 on one end of shaft 35 which supports belt roll 3.

The auxiliary belt 23 is driven by means of a sprocket 36 on shaft 35 adjacent sprocket 34 and a chain 37 which drives sprocket 38 on an upper cross shaft 39 which is journaled in the adjustable supporting frame 27 for the auxiliary belt. On the opposite end of shaft 39 there is a gear 40 which meshes with a similar gear 41 on the end of shaft 42 which supports driving pulley 25 of belt 23.

As is clearly shown in Figs. 1 and 5 to 8, the teeth and recesses respectively are of substantially uniform shape around the periphery of the disks and the teeth on each of the disks are blunt and form shallow recesses between them which are approximately a width the same as the width of the teeth. Also, each tooth has a radial seat portion on one side at its tip for transmitting rotating force to the disks from the cans and a convex portion on its opposite side for transmitting movement to the cans, as will appear from the detailed description of the movement of the cans from the single line, between the disks, and into the several lanes into which it is desired to distribute them. The paths of greatest radius of the teeth are spaced in non-tangential relation. The shallowness of the recesses compared with the radii of the disks, a characteristic of the mechanism as illustrated in the several figures of the drawings, together with the shape of the teeth and their relation to the recesses, insures a gradual lateral movement of the cans from the single line to the several lanes.

Figs. 5-8, inclusive, illustrate the interaction of the cans on one another as they undergo division under the control of the toothed wheels 8 and 9 from a single line 1 into two parallel lines 10 and 11. These figures show only the cans on scuff plate 7, that is to say, the single line of cans which is undergoing division into two lines. The first operation is the displacement of the cans consecutively and in opposite directions out of the straight line in which they are fed onto the scuff plate at its right hand end. This is done by means of the teeth of the toothed wheels.

As soon as this displacement occurs, the feeding pressure transmitted from one can to another from the right-hand end or head of the line undergoing separation causes the displaced cans to interact on one another and exert laterally shifting forces upon each other. The initial displacement by the teeth of the wheels is comparatively small and this initiates further lateral displacement caused by the camming action of the cans one upon another under the influence of the feeding pressure. The extent of such lateral displacement is controlled by the depth

of the recesses between the teeth of the two toothed wheels 8 and 9. The result is to place the cans in two gradually diverging lines, such as indicated by numerals 66 and 67 in Fig. 5, and then a final separating movement is given the cans to move them along the gradually divergent lines into parallel rows or lines. This final movement in the form of apparatus here illustrated is also imparted by the teeth of the toothed wheels in cooperation with the interaction of the cans one upon another.

The relations of the cans to one another and to the teeth and recesses of the wheels 8 and 9, as shown in Figs. 5-8, inclusive, is that assumed by the cans when the apparatus is operating at extremely low speed. That is to say, the impact or rebounding action of the cans as they engage the wheels, or as they are engaged by the wheels, at high speed, is not taken into account in these figures.

In these figures, the cans have been lettered from *a* to *i*, inclusive, and the teeth and recesses are indicated by the capital letters T and R together with subscript small letters indicating the particular teeth which initially displace the respective cans, and also the particular recesses into and out of which the respective cans move as they pass between the wheels. We will trace the movement of can *g* from the time it enters between the wheels until the time it leaves the same.

In Fig. 5, can *g* is just being displaced, or deflected, by tooth Tg of wheel 8 towards recess Rg of wheel 9. At the instant illustrated in Fig. 5, the feeding pressure is imparted by can *i* which is still on belt 2 (and by the other cans back of it) to can *h* which is still in the single straight line. This feeding pressure is transmitted from can *h* to can *g* to can *f*. Can *f* is both rotating wheel 8 by contact with recess Rf, and also pushing can *e* forward.

In Fig. 6 can *g*, being squeezed between cans *h* and *f*, has been shifted away from tooth Tg against the bottom of recess Rg and is now pushing can *f* forward, which, in turn, is serving to rotate wheel 8 and also continues to push can *e*. Can *g* also tends to rotate wheel 9, but the two wheels 8 and 9 are kept in step with one another by means of the gearing shown in Fig. 4.

It will be observed from Fig. 2 that guide rails 6 are provided with extensions 6a which are approximately of the same width as the height of the cans, and hence occupy substantially all of the vertical distance between the upper and lower sections of wheels 8 and 9, as shown in Fig. 2, and as shown in Figs. 5-8, for example, the left-hand ends of these guide rails are flared outwardly so as to permit the lateral movement of can *g* into recess Rg as described above.

In Fig. 7 can *g* has advanced until it is substantially on the center line between the axes of the two wheels 8 and 9 where it may again be engaged by tooth *g*, thereby holding the can within recess Rg and definitely nearer to the axis of wheel 9 than of wheel 8, or, in other words, holding can *g* definitely displaced in the same direction to which it was initially displaced by tooth Tg. In the condition of affairs shown in Fig. 7, can *h* has been initially displaced by tooth Th towards wheel 8 and is in the act of moving under the interaction of cans *i* and *g* into recess Rh. In another instant it will strike the flared portion of extensions 6a of the left-hand guide rail and immediately thereafter reach the bottom of recess Rh.

In Fig. 8, can *g* has advanced to substantially the end of its diverging line comprising cans *e*, *g*, *i*, and can *h* has moved definitely into the left-hand diverging line comprising cans *d*, *f*, *h*, *i*. Can *g* is undergoing its final separating movement under the pressure of the rounded front surface of tooth Th of wheel 9.

Referring now to Figs. 9 and 10, there is here shown a modified form of dividing apparatus for dividing a single line of cans into three separate lines or rows, there being an unequal distribution of the cans among the three rows. In this instance two cans are placed in each of the outside rows 43 and 44 to each single can delivered to the center row 45.

In order to accomplish this distribution, the toothed wheels 46 and 47 are provided with cooperating teeth and recesses of non-uniform length and depth, respectively, the distances of the ends of the teeth and the bottoms of the recesses from the centers of their respective wheels serving to determine the lane into which the cans acted upon by the cooperating teeth and recesses are to enter. The wheels of Fig. 9 have cooperating teeth and recesses so arranged as to deliver one can to each of the three lanes 43, 44 and 45 as cans *k*, *l*, *m*, followed by the delivery of two cans to the two outside rows 43 and 44, as, for example, cans *n*, *o*. Then the cycle is repeated starting with the delivery of cans *p*, *q*, *r*, one to each of the three rows. In order to accomplish such distribution of the cans, the teeth of the wheels 46 and 47 are of three different lengths with the order of the teeth on each wheel, in the direction of rotation of the wheel, being a tooth of minimum length, a tooth of maximum length, two teeth of intermediate length and a second tooth of maximum length. As in the preceding figures, the recesses in each wheel correspond to the length of the corresponding teeth in the opposite wheel. Wheels 47 and 48 are keyed to shafts 48 and 49 and these shafts are geared together in a similar manner to shafts 17 and 18 so that the can dividing wheels rotate in unison as before.

As in the form of apparatus previously described, the cans are advanced in a single line over a scuff plate indicated by reference numeral 50, the feeding pressure being supplied by a conveyor belt 51, as before, and the wheels 46 and 47 rotated by this feeding pressure acting through the cans, the pressure being transmitted from one can to another.

In the arrangement shown, 20 cans pass through the wheels for each revolution of the wheels, and of these cans four go to the center line 45 and 8 to each of lines 43 and 44. In this figure can *r* is being positioned by tooth Tr and recess Rr for delivery to the center line 45. Can *m* has previously been delivered to this line by tooth Tm and recess Rm and can *w* will be delivered to this line later on. Following can *r*, can *s* will be delivered to line 43 by tooth Ts and recess Rs, and can *t* will be delivered to line 44 by tooth Tt and recess Rt. Can *u* will be delivered to line 43 and can *v* to line 44. Hence the four cans in between those delivered to the center line 45 are delivered alternately to the outer lines 43 and 44.

In this modification, the scuff plate 50, instead of being cut away so as to cooperate with the faces of the toothed wheels 46 and 47, as does scuff plate 7, is arranged to underlie the toothed wheels. It is adjusted close to the undersurface of the lower sections of the two wheels,

as shown in Fig. 10, so as to cause the lower beads of the cans to engage the toothed wheels and preserve the sides of the cans from being marred.

In this modification also it will be understood that the cans are fed between the dividing wheels 46 and 47 by the pressure exerted by the cans on the feed belt 51 which may be similar to feed belt 2 of Fig. 1. The guide rails 52 are similar to guide rails 6a and are flared, as shown in Fig. 9, in such a way as to permit the cans to gradually move sidewise into the recesses of wheels 46 and 47, bottoming in these recesses at the time the cans reach the center line between the two wheels. These flared portions thus prevent a too abrupt lateral shift of the cans after the initial displacement by the wheel teeth. The cans after being distributed into lanes 43, 44 and 45 are carried forward by means of a conveyor belt 53.

In the modified form of apparatus shown in Fig. 11, the teeth and recesses of the dividing wheels 54 and 55 are arranged to distribute the cans into three separate lanes 56, 57 and 58, but unlike the apparatus of Fig. 9 the cans are equally divided between these three lanes. Thus the cycle of can delivery for this form of apparatus is $a' b' c'$, one can to each of lanes 56, 58 and 57, respectively, and this cycle is repeated so long as the apparatus remains in operation. To accomplish such distribution of the cans, the wheels 54 and 55 are formed as shown with each tooth, in the direction of rotation of the wheels, being followed by two recesses with the first of said two recesses being shallower than the second and the relation of the wheels to one another being such that during their rotation the teeth of each wheel come opposite the deeper recesses of the opposite wheel and the shallower recesses come opposite one another.

The cans are fed into the apparatus by means of a belt 59 and carried away from it by a second belt 60. Scuff plate 61 is constructed in the same manner as scuff plate 50 of the apparatus of Fig. 9, and the ends of can guide rails 62 are flared similarly to guide rails 52. In this instance, as in Figs. 9 and 1, the two pairs of coacting wheels are exactly similar, thereby simplifying the manufacture. The distribution of the cans between the three lanes 56, 57 and 58 is determined as before by the distances of the teeth and recesses from the centers of their respective wheels 54 and 55. However, the movement or shifting of the cans from the single line into the three lanes is not effected entirely by the action of the wheels upon the cans but, in addition to the wheel action, includes the interaction of some of the cans upon others. Thus the can at the position occupied by can c' is used to deflect cans which are being moved toward the two outer lanes 56 and 58. In the position of the cans shown in Fig. 11, can e' is being pushed forward by can f' and deflected toward lane 58 by can c' . With the shape of the wheels as shown in Fig. 11 it is preferable to have the separating rail between lanes 57 and 58 project nearer to the wheels than the rail between lanes 57 and 56.

In the modification of Fig. 12, the cans are divided from a single line into two lines, but twice as many cans are delivered to lane 63 as to lane 64. The cycle of can delivery is therefore indicated by cans $k' l' m'$. The feed and delivery belts, can guides and scuff plate are constructed similarly to those previously described

in connection with Figs. 9 and 11. The can separating or dividing wheels 65 and 66 are not similar in outline, but the distribution of the cans is determined in the same manner as in the other forms of the apparatus, namely, by the variation in the distances from the centers of the respective wheels of the teeth and recesses. Thus Tk' and Tl' are both the same distance from the center of wheel 65 and consequently divert cans k' and l' both to lane 63, while the bottom of recess Rm' is closer to the center of wheel 65 and this permits tooth Tm' of wheel 66 to shift can m' into lane 64. The recesses and teeth Rk' , Rl' and Tm' of wheel 66 complement, respectively, teeth Tk' , Tl' and recess Rm' .

In all of these forms of the improved apparatus the cans are fed forward between the dividing or separating wheels by pressure exerted on the cans at the rear of the line of cans undergoing separation, and the teeth of the separating wheels disturb the equilibrium of the forces transmitted from one can to another along the line of cans, thus displacing the cans laterally in one direction or the other toward recesses of the cooperating wheel. The position of each pair of teeth and recesses coacting upon the respective cans as they pass the center line between the two wheels determines the particular lane into which each can is to be delivered, the delivery of the cans to such lanes being accomplished by the combined camming action of one can upon another and the pressure of the walls of the recesses and the teeth. This method of operation takes place regardless of whether the cans are divided from a single line into two lines of the same number of cans as in Fig. 5, in three lines of unequal numbers of cans as in Fig. 9, in three lines of equal numbers of cans as in Fig. 11, or in two lines of unequal numbers of cans as in Fig. 12.

One of the most important considerations in the practical operation of can-dividing apparatus is to provide for the automatic starting and stopping of the mechanism. For example, in the operation of a packing plant, gaps in the single line of cans coming from the labelling machine may frequently occur. These may be caused by a temporary stoppage of the labelling machine, or a temporary cessation of the feeding of the cans to the labelling machine, and for other reasons. If the can-separating apparatus will not restart its operation automatically, after a gap in the line of cans occurs, it is a serious matter. Such automatic restarting, however, is provided for in the apparatus of the present invention because of the fact that the can-separating toothed wheels 8 and 9, or 46 and 47, etc., are rotated by the cans themselves. Hence when a gap in the line of cans occurs, rotation of the wheels stops immediately. The inertia of the wheels is insufficient to feed the cans forward on the scuff plate because of the friction of these cans on the plate.

When feeding pressure at the rear of the line of cans undergoing separation on the scuff plate is removed by failure of the supply of cans on feed belt 2, for example, the last can to be fed onto the scuff plate will move only a comparatively short distance. The wheels 8 and 9 will stop with a full complement of cans in position between them. Hence, as soon as the feeding of the cans in the supply lines is re-established, the movement of the cans over the scuff plate

and between the toothed wheels is also restarted immediately.

With the apparatus of the present invention, not only can the cans fed in a single line be rearranged into two or more lines with great rapidity, but also the number of lines into which the single line is to be divided can be varied to suit all usual requirements. As an example, by employing the apparatus of Figs. 1 and 2 together with the apparatus of Fig. 9, to further divide the cans of the two outer rows 43 and 44, distribution of a single line into five lines each containing the same number of cans can be obtained. With various combinations of the several forms of apparatus illustrated, other particular can distribution to meet desired conditions can be secured.

It will be understood that the illustration and description above given is for the purpose of explaining the invention, but that the invention is not limited to the particular apparatus thus disclosed, and that the invention extends to changes in the construction which come within the scope of the appended claims. Thus, if desired, other separating wheel contours having teeth and recess formation to produce various can distributions between the several lines of cans of those illustrated, as well as distribution into different numbers of lines, can be devised without departing from the spirit of the present invention and the scope of the claims. It will be further understood that the term "cans" as employed herein is used in a generic sense and includes bottles and other articles of a general cylindrical nature which it may be desired to handle in quantities in accordance with the spirit of the within specification.

I claim:

1. In an apparatus of the class described, a stationary support having a substantially horizontal surface, means for feeding cans in upright position in a single line along the support, two spaced parallel shafts at right angles to the support, one positioned on each side of the line of cans, a plurality of lanes for receiving the cans, each of said shafts carrying two wheels having teeth and recesses in their peripheries adapted to cooperate with one another as the cans are fed between the wheels to provide can positioning pockets, the position of the said pockets as each can passes the center line between the wheels determining the lane which is to receive the can, the lower wheels on each shaft being arranged to rotate in close proximity to the surface of the support so as to coact with the lower beads of the cans, and the upper wheel on each shaft being arranged to coact with the upper beads of the cans.

2. In an apparatus of the class described, a stationary support, means for feeding cans in upright position in a single line along the support, two spaced parallel upright shafts operatively connected for conjoint rotation in opposite directions, one positioned on each side of the line of cans, each of said shafts carrying two wheels having teeth and recesses in their peripheries, the teeth of the wheels on one shaft cooperating with the recesses of the wheels on the other shaft to rearrange the cans in a plurality of lines as they are fed between the shafts, the lower wheel on each shaft being arranged to rotate in close proximity to the surface of the support so as to coact with the lower beads of the cans, and the upper wheel on each shaft being arranged to coact with the upper beads of

the cans and being mounted for adjustment thereon for operation upon cans of different heights.

3. In an apparatus of the class described, a stationary support, means for feeding cans in upright position in a single line along the support, two spaced parallel upright shafts operatively connected for conjoint rotation in opposite directions, one positioned on each side of the line of cans, each of said shafts carrying two disks having teeth and recesses in their peripheries, the teeth of the disks on one shaft cooperating with the recesses of the disks on the other shaft to rearrange the cans in a plurality of lines as they are fed between the shafts, the lower disk on each shaft being arranged to rotate in close proximity to the surface of the support so as to coact with the lower beads of the cans, and the upper disk on each shaft being arranged to coact with the upper beads of the cans.

4. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a plurality of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks, the teeth being of substantially the same width as that of the recesses, whereby a gradual lateral movement of the cans from the single line into the several lanes is produced.

5. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a plurality of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks and the bases of which substantially conform to the curvature of the cans, the teeth being of substantially the same width as the recesses, whereby a gradual lateral movement of the cans from the single line into the several lanes is produced.

6. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a plurality of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks, and the bases of which substantially conform to the curvature of the cans, said teeth having radial seat portions on one side at their tips for transmitting rotating force to the disks from the cans and convex portions on their opposite sides for transmitting movement to the cans, whereby gradual lateral movement of the cans from the single line into the several lanes is produced.

7. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a

plurality of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks and the bases of which substantially conform to the curvature of the cans, said teeth having radial seat portions on one side at their tips for transmitting rotating force to the disks from the cans and convex portions on their opposite sides for transmitting movement to the cans, whereby a gradual lateral movement of the cans from the single line into the several lanes is produced, certain of the teeth of one of said disks being longer than the others, and the recesses corresponding thereto in the opposite disk being correspondingly deeper thereby producing a predetermined uneven distribution of the cans among the several lanes.

8. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a plurality of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks and the bases of which substantially conform to the curvature of the cans, and the paths of greatest radius of the disks being spaced in non-tangential relation, whereby a gradual lateral movement of the cans from the single line into the several lanes is produced.

9. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a plurality of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks and the bases of which substantially conform to the curvature of the cans, and the paths of greatest radius of the disks being spaced from one another at their nearest point substantially one-half the diameter of the cans, whereby a gradual lateral movement of the cans from the single line into said lanes is produced.

10. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, a pair of lanes on the opposite side of the disks for receiving the cans, said disks having blunt teeth forming between them recesses which are shallow compared with the radii of the disks and the bases of which substantially conform to the curvature of the cans, and the teeth and recesses, respectively, being substantially of uniform shape around the periphery of said disks, whereby the cans gradually are moved laterally from the single line into said pair of lanes and are distributed alternately into said pair of lanes.

11. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, three lanes on the opposite sides of said

disks for receiving the cans, one of the lanes being a central lane opposite the space between said disks, the other two lanes being outside lanes at opposite sides of said central lane, and each being opposite one of said disks, said disks having blunt teeth forming between them shallow recesses, thereby producing a gradual lateral movement of the cans from the single line into the several lanes, the teeth on each disk being of minimum, maximum and intermediate lengths, with the order of the teeth on each disk, in the direction of rotation of the disk, being a tooth of minimum length, a tooth of maximum length, two teeth of intermediate length and a tooth of maximum length, the recesses in each disk corresponding to the length of the corresponding teeth in the opposite disk, whereby the cans are moved laterally from the single line into said three lanes and are so distributed into said lanes that one can passes into the central lane for each two cans which pass into each of the outside lanes.

12. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, three lanes on the opposite sides of said disks for receiving the cans, one of the lanes being a central lane opposite the space between said disks, the other two lanes being outside lanes at opposite sides of said central lane, and each being opposite one of said disks, said disks having blunt teeth and between them shallow recesses, each tooth, in the direction of rotation of the disks, being followed by two recesses with the first of said two recesses being shallower than the second, the relation of said disks to one another being such that during their rotation the teeth of each disk come opposite the deeper recesses of the opposite disk and the shallower recesses come opposite one another, whereby the cans gradually are moved laterally from the single line into said three lanes and distributed evenly into said lanes.

13. In an apparatus of the class described, a pair of toothed disks arranged in spaced relation in the same plane and interconnected for conjoint rotation in opposite directions, means on one side of the disks for continuously feeding between them a single line of cans in upright position, three lanes on the opposite sides of said disks for receiving the cans, one of the lanes being a central lane opposite the space between said disks, the other two lanes being outside lanes at opposite sides of said central lane, and each being opposite one of said disks, said lanes being defined by partitions, one of said partitions extending closer to the periphery of its adjacent teeth than the other partition, said disks having blunt teeth and between them shallow recesses, each tooth, in the direction of rotation of the disks, being followed by two recesses with the first of said two recesses being shallower than the second, the relation of said disks to one another being such that during their rotation the teeth of each disk come opposite the deeper recesses of the opposite disk and the shallower recesses come opposite one another, whereby the cans gradually are moved laterally from the single line into said three lanes and distributed evenly into said lanes.