K. W. EMERSON.

CAN FEEDING APPARATUS.

APPLICATION FILED AUG. 29, 1921.

1,428,883. Patented Sept. 12, 1922.

3 SHEETS—SHEET 1.

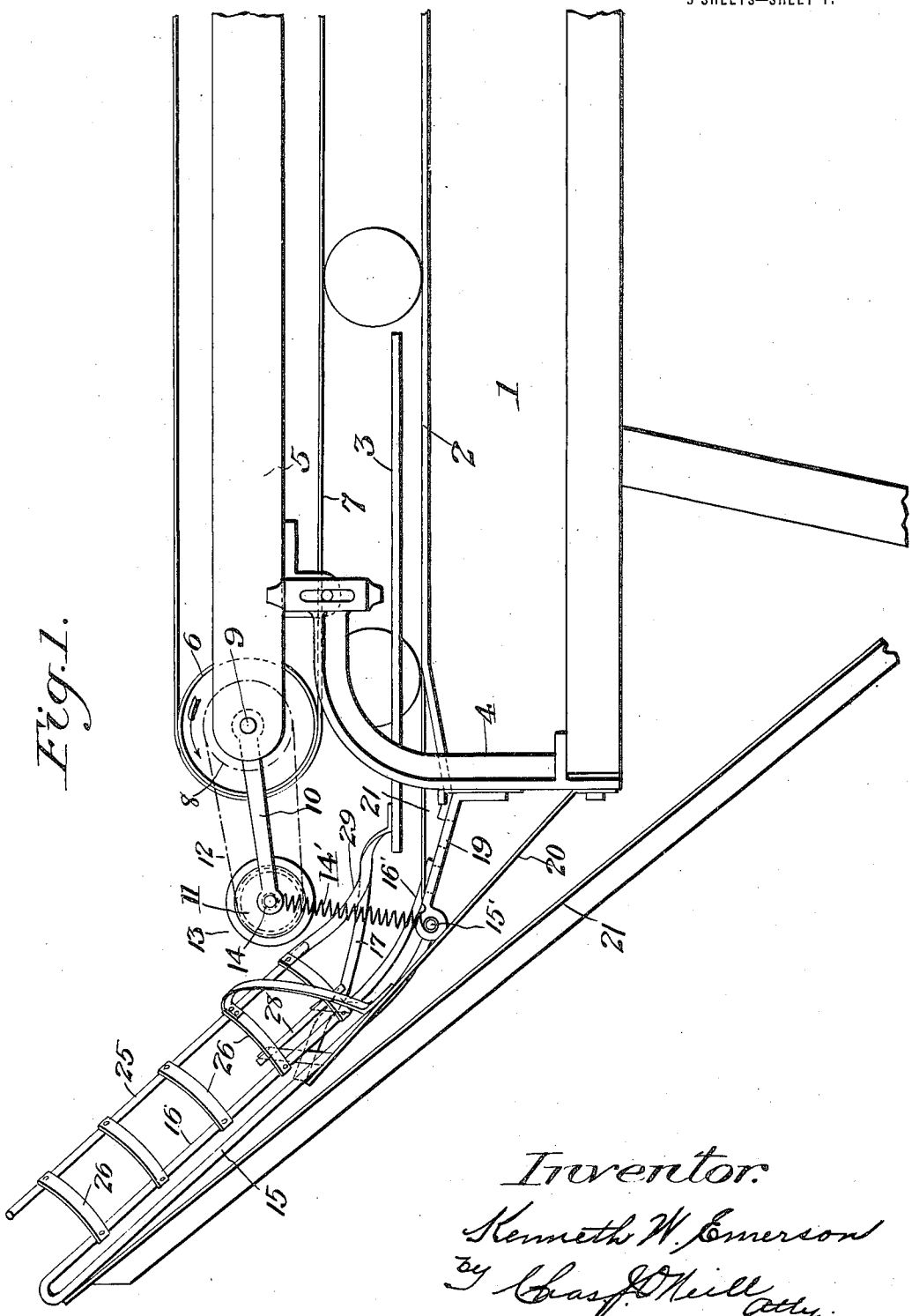


Fig. 1.

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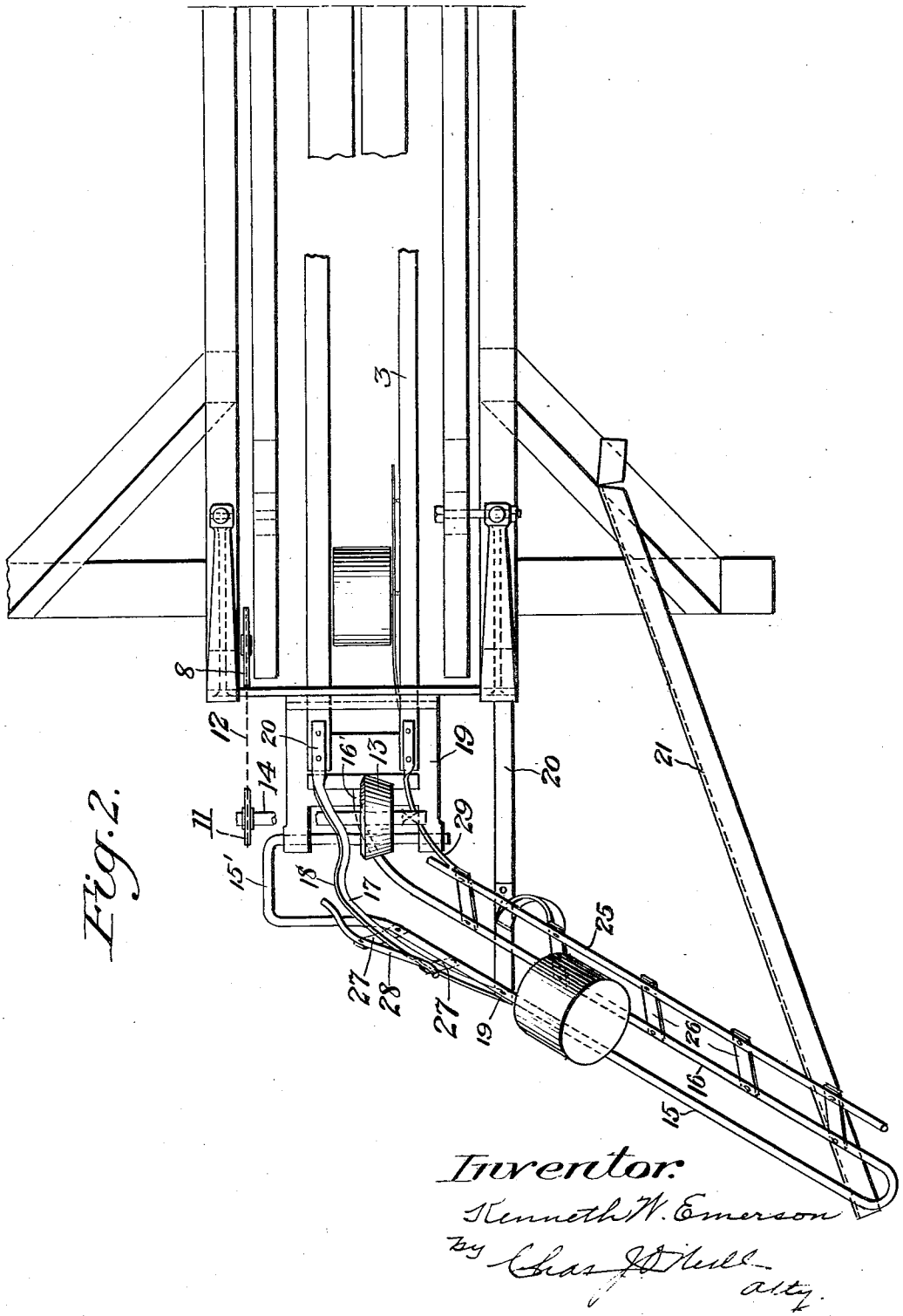


Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 4.

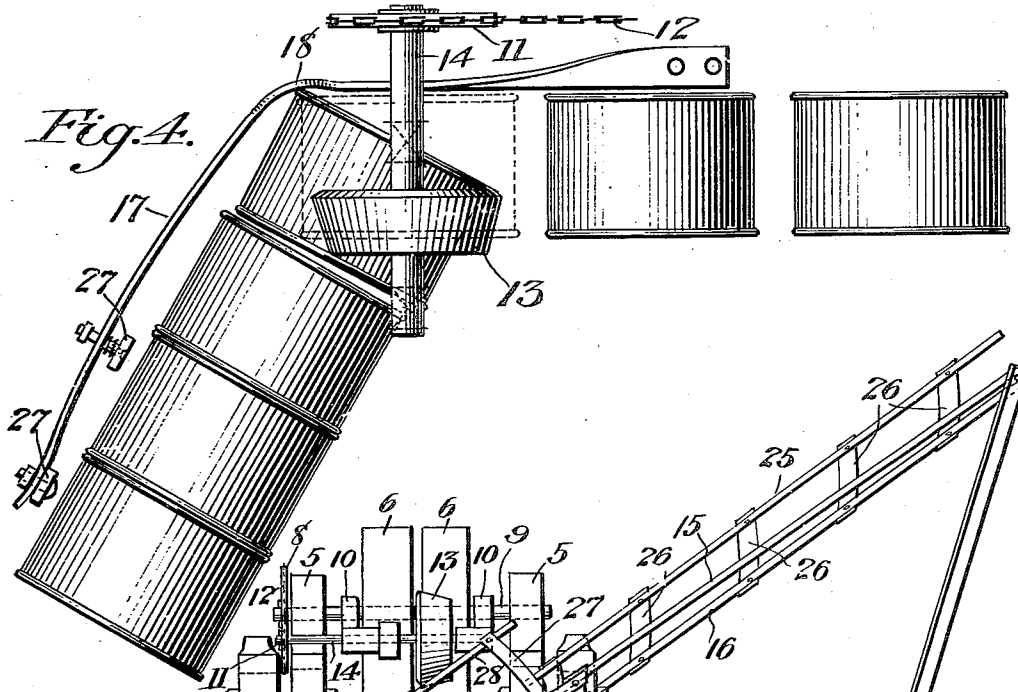


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CAN-FEEDING APPARATUS.

Application filed August 29, 1921. Serial No. 496,687.

To all whom it may concern:

Be it known that I, KENNETH W. EMERSON, a citizen of the United States, residing at Honolulu, Territory of Hawaii, have invented certain new and useful Improvements in Can-Feeding Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to can feeding apparatus, more particularly to means for feeding cans or the like to labelling machines, in which the cans are rolled through the machines and are, therefore, introduced into the machines at spaced intervals with their axes of rotation normal to the direction of motion. The present invention is designed to receive the cans in end to end stacked relation, advance the stack of cans to the feed end of the labelling machine, and then rotate each lowermost can into rolling relation at the entrance to the machine, and at the same time effect a proper spacing of the cans while materially increases the speed of the feeding operation. To these ends the invention comprises a feed chute preferably inclined vertically and laterally with respect to the entrance of the runway or feed guide of the labelling machine, said chute being adapted to receive the cans in end to end stacked relation and advance them by gravity in stacked form, with an abutment at the lower end of the feed chute adapted to engage the lateral edge of the lowermost can, associated with a driven friction wheel located above the end of the feed chute and adjacent the feed entrance of the machine, which is effective in engaging the surface of the lowermost can at approximately the time the lateral edge of said can engages the abutment, so that the can is first drawn slightly out of line with the stack and then rotated about its point of engagement with the abutment, until the can is in proper position to roll in at the feed entrance of the labelling machine, the particular co-action of the abutment and the feed roller aforesaid effecting the proper spacing of the cans in their passage through the machine.

A simple and effective form of the invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a fragmentary side elevation of a typical can labelling machine having the improved can feeding device attached thereto;

Fig. 2 is a plan view of the same;

Fig. 3 is an end elevation; and

Fig. 4 is an enlarged diagrammatic plan view of the abutment and the feed roller illustrating the co-action of these elements in shifting the cans from sliding stacked relation into rolling spaced feeding relation.

One of the standard modes of applying labels to cans by automatic machinery is to feed the cans manually into an inclined runway and thence into the machine where the cans are rolled along by a belt drive engaging the surfaces thereof, the cans being properly spaced so that each can rolls over the top of a stack of labels and picks up the upper label, which is wrapped about the surface of the can and smoothed by the continued rolling action. In order to maintain the proper intervals between the cans, for the effective application of the labels, it has been the practice to provide the feed end of the machine with the roll which engages the surface of the entering cans, which roll is driven at a somewhat slower speed than the normal rate of travel of the cans through the machine, and which, therefore, retards each can in its rolling operation, upon its entrance to the labelling machine, thereby effecting a spacing of the cans passing through the machine and preventing the cans rolling through the machine in contact with each other, which is a condition precedent to the proper application of the labels, the feed of the cans at spaced intervals permitting the last end of the label which is rolled about the can properly overlapping the first or forward end of the label, by an amount by which the length of the label exceeds the circumference of the can, so that the final end of the label is neatly and accurately applied at the overlap. It is evident that if the cans were permitted to roll in contact with each other in the labelling machine,

this overlapping of the ends of the labels could not be smoothly and uniformly effected, and it is for this reason that the spacing of the cans in proper sequence by the special means indicated has been found necessary. By reason of the fact that the feed and spacing wheel on the old type of can labelling machine had to be operated at a slower speed than the normal advance of the cans through the machine, the rate of feed of the cans to the machine was relatively slow, first, because the cans must be fed individually in side to side relation, which in itself is a slow operation, and then are advanced one at a time into the machine by the feed roller, which operates at a lesser rate of speed than the normal rate of travel of the cans through the machine. It was recognized that any device which will receive and advance the cans in end to end or stacked relation and then deliver them to the machine in side to side rolling relation at properly spaced intervals will not only make the work of the feeder easier, but will increase the capacity of the labelling unit. This highly desirable result is obtained by the present invention, which is adapted to the use in connection with a standard labelling machine operating on the general principle just described.

Referring to the drawings, the numeral 1 indicates the labelling machine, which includes a table or runway 2 over which the cans are fed in sequence and at proper intervals by means of a feed belt 7 running over suitable pulleys, one of which 6 is shown journalled in the side frames 5, which in turn are supported by the end brackets 4, the rolling series of cans being held between suitable guide rails 3, 3. Mounted on the shaft 9 of the belt pulley 6 are two arms 10, in the forward ends of which is journalled a shaft 14, carrying on one end a sprocket wheel 11, which is connected with a chain 12 to a sprocket 8, fastened on shaft 9, the ratio of the sprockets 8 and 11 being such that the shaft 14 is driven at a relatively higher rate of speed than sprocket 8, and, therefore, said belt 7. Fixed to the shaft 14 is a frusto-conical roller 13 provided with a frictional surface, such as a covering of rubber or the like, the said friction wheel or roller 13 being disposed above the feed entrance of the labelling machine and slightly to one side of the longitudinal axis of the machine, which is parallel with the direction of travel of the cans through the machine. The outer end of one of the arms 10 is connected with a tension spring 14^1, the other end of which is anchored to a fixed part of the machine, so that the spring tends to draw the roller 13 downward and into contact with the surface of the cans being fed to the machine, as will be more particularly pointed out hereinafter. The friction wheel or roller 13 and its various cooperating elements may replace the feed roller usually employed in machines of this type, which feed roller is generally cylindrical in form, is positioned directly over the feed passage of the machine, and is necessarily driven at a slower rate of speed than the feed belt, in order to effect the proper spacing of the cans, as hereinbefore described.

Projecting from the forward end of the machine is a bracket 19, having eyes at its forward end to which the inclined runway usually employed in machines of this general type is secured, said runway being adapted to feed the cans successively under the feed roller and over the forward section 21 of the table 2. In applying the present invention, the ordinary runway heretofore employed has been discarded and a special form of feed chute substituted therefor, as will be now more particularly described. Said feed chute is preferably formed of round sectional rods 15 and 16, spaced at proper intervals and parallel for the greater portion of the length of the chute, and adapted to receive a stack of cans in end to end relation and advance the stack by gravity toward the feed end of the machine. To effect this automatic feeding of the stack, the chute, comprising the rods 15 and 16, is inclined upwardly and laterally with respect to the line of feed of the cans through the machine 1. The vertical inclination of the chute should be sufficient to insure a free sliding advance of the stacks of cans by gravity downward to the turning point where the cans successively enter the feed entrance of the machine. An angle of approximately 30° to the horizontal has been found effective for this purpose. The angle which the chute makes with the center line of the machine, or the like of travel of the cans through the latter, is capable of considerable variation, but for cans that are of relatively low height as compared with their diameter, if the chute is given an inclination of 60° to the line of feed of the cans through the machine, excellent results are realized. As a general proposition, and for all sized cans, the lateral angular inclination of the chute will give satisfaction, which presents the cans so that the diagonals thereof as the cans approach the lower end of the chute are approximately parallel to the center line of feed of the cans through the labelling machine. In order to properly support the feed chute and the stacks of cans carried thereby, said chute is attached at its lower end to the bracket 19 of the labelling machine, the rod 15 of said chute having at its lower end a U-shape bend 15′, one leg of which extends through and is secured in the eyes on the forward end of the bracket 19. The lower end of rod 16 of the chute is curved laterally and terminates substantially in the center line of the machine,

where it is attached to the middle of the bracket 19 and passes through the forward extension 21 of the table 2. The outer end of the chute formed by the rods 15 and 16 is supported by an inclined strut 21, rivetted to the outer ends of the rods 15 and 16, which latter may be formed of a single length with a bend at the outer end of the chute, and the inner end of said strut is fastened to one of the legs of the labelling machine, as illustrated in Figs. 2 and 4. A second inclined strut 20 extends from the lower end of one of the machine brackets 4 and is secured at its outer end to the rods 15 and 16 by rivets or the like. Disposed at one side of the feed chute and preferably connected to the rod 16 by braces 26 is a guard rail 25, the lower end of which is connected with the corresponding guide rail 3 of the labelling machine by a strap 29 which constitutes a guard or guide for the cans as they are being turned into rolling position. Secured at one end to the rod 15 of the feed chute and at the other end to the left-hand guide rail 3 of the labelling machine is an abutment or guide rail 17, which rises gradually from the plane of the chute, formed by the rods 15 and 16, and is provided with an angular bend 18 at its highest point, from which the said guide rail inclines downwardly to its point of attachment to the rail 3 of the machine. The said guide rail 17 is preferably made of flexible or resilient material, such as sheet steel or brass, and is preferably flexibly mounted or secured to bracket pieces 27, 27, attached to the rod 15, as indicated in Figs. 2 and 4, so that it will yield slightly under the impacts delivered by the stacks of cans sliding down the feed chute formed by rods 15 and 16. It will also be noted that the guide rail 17 is inclined inwardly from the line of direction of the feed chute, so that said guide rail will first retard and finally arrest the forward motion of the lowermost can of the stack, and therefore, of the stack, by engaging the lowermost can at a point in its edge, as illustrated in a somewhat diagrammatic view represented in Fig 4. Inasmuch as the cans sliding down the chute formed by the rods 15 and 16 acquire considerable momentum, it may be found desirable to provide an additional guard rail such as 28, connected at its top to the bracket pieces 27, 27, which will prevent the can jumping out of the feed chute formed by the rods 15 and 16, or from becoming disarranged when each successive can strikes the abutment or guide rail 17 at the bend 18 of the latter.

It will be noted that the friction wheel 13 is so disposed above the lower end of the feed chute that it will engage the surface of the can at or about the time the outer edge of the can strikes the bend 18 in the guide rail 17. This relation of the parts is shown more or less diagrammatically in Fig. 4, and while the figure does not show the exact relation of the several parts, all of which are more correctly illustrated in Fig. 2, it does indicate with sufficient clearness the general sequence of operations incident to shifting the lowermost can of the stack from an axial sliding relation to a circumferential rolling relation and the actual spacing of the cans at definite intervals as they are rolled forward from the feed chute into the labelling machine. In actual practice the foremost corner of the lower can of the stack is engaged and arrested at the bend of the guide rail 17 at substantially the same instant that the surface of the can is engaged by the friction wheel 13. The inside guide rail 29, Figs. 1 and 2, is to prevent the action of the friction wheel 13 turning the can too far, as the turning action would be arrested when properly completed by the engagement of the edge of the can with the side guide rail 29, so that the can is positively constrained to enter the machine in correct alignment with the feed belt 7 and between the guide rails 3.

The feed chute, formed primarily of the rods 15 and 16, may be of any desired or convenient length to receive the cans in stacked relation, as indicated, and a practical form of the invention involves a feed chute of sufficient length to receive at least ten cans in end to end stacked relation, as shown, which is also a convenient number of cans to be handled by a single operator.

In the normal operation of the machine it is customary to employ two men to feed the cans thereto, each man taking a row or stack of from six to ten cans, end to end, from the trays in which the cans are arranged and deposits the stack in the chute. The cans slide down the chute by gravity until the lowermost can engages with its outer edge the guide rail 17 at or about the turn 18 in the latter, which arrests the advance of the stack of cans in the chute. At the same time the lowermost can is engaged by the friction wheel 13, and the latter being positively driven tends to impart a rotary motion to the can about its point of engagement with the guide rail as a center. The first result of the engagement between the roller and the surface of the can is to draw the can slightly out of line with the stack, as illustrated in Fig. 4, then rock the can slightly forward, and finally rotate it about the edge thereof, which engages the guide rail 17 as a center, to the position shown by the dotted line in Fig. 4, in which the cans are disposed with their axes of rotation normal to the direction of movement of the cans through the machine, so that the cans roll successively and at spaced intervals onto the forward table section 21 of the labelling machine, whence they pass in regular sequence through

the machine and have the labels properly applied thereto. The spacing of the cans during the turning movement thereof is due to the fact that the diagonal of the lowermost can is greater than the diameter thereof, so that the spaces between the successive cans must be as great or greater than the difference between the diagonal and diameter of the cans, inasmuch as each can must be rotated about its point of contact with the abutment 17 and then rolled forward by the friction wheel 13 before the next can in the series moves downward into engagement with the abutment.

The advantages of arranging the cans in stacked relation as indicated are that a larger number of cans may be carried on a tray of a given size, the operator can handle a larger number of cans at one time in feeding them to the machine, for the reason that he can pick up a stack of from 8 to 10 cans disposed end to end and deposit the stack or row in the feed chute and the arrangement of the cans in stacked relation in the feed chute enables each can, when it reaches the abutment, to be quickly engaged by the friction wheel and turned into proper position to be rolled forward into the labelling machine. It has been found in practice that the new feeding device increases the capacity of the labelling machine from twenty to fifty per cent without in any way impairing the proper application of the labels.

What I claim is:

1. A can feeding device comprising an inclined chute to receive and advance the cans in end to end stacked relation, an abutment at one side of the lower end of the chute to engage the edge of the lowermost can, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can about its point of engagement with the abutment to bring the can into rolling position at the entrance of a runway.

2. A can feeding device comprising an inclined chute to receive the cans in end to end stacked relation, a guide rail at the lower end of the chute to engage the edge of the lowermost can of the stack, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can and first draw the can slightly out of line with the stack and then rotate it about its point of engagement with the guide rail to bring the can into rolling position at the entrance of a runway.

3. A can feeding device comprising an inclined chute to receive and advance a stack of cans in end to end relation, a resilient abutment at one side of the lower end of the chute to engage the edge of the lowermost can, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can about its point of engagement with the abutment to bring the can into rolling position at the entrance of a runway.

4. A can feeding device comprising a feed chute including parallel rods supported in inclined relation laterally and vertically of a runway of a machine, a guide rail at the end of the chute to arrest the movement of the cans in the chute, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can about its point of engagement with the abutment to bring the can into rolling position at the entrance of a runway.

5. A can feeding device comprising a feed chute including parallel rods supported in inclined relation laterally and vertically of a runway of a machine, guard rails at the sides of the chute, a guide rail at the end of the chute to arrest the movement of the cans in the chute, and a driven friction wheel above the end of the chute to engage and rotate the lowermost can about its point of engagement with the abutment to bring the can into rolling position at the entrance of a runway.

6. The combination of a can labelling machine through which the cans are rolled over a runway, an inclined feed chute supported at the entrance to said runway to receive the cans in end to end stacked relation, and means located at the lower end of the chute to shift the cans successively into rolling position at the entrance of the runway and deliver the cans to the runway at spaced intervals.

7. The combination of a can labelling machine having a runway into and through which the cans are rolled, an inclined feed chute supported at the entrance of the runway to receive and advance the cans in end to end stacked relation, an abutment at one side of the lower end of the chute to engage the edge of the lowermost can, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can about its point of engagement with the abutment to bring the can into rolling position at the entrance of the runway.

8. The combination of a can labelling machine having a runway into and through which the cans are rolled, an inclined feed chute supported at the entrance of the runway to receive and advance the cans in end to end stacked relation, a guide rail at one side of the lower end of the chute to engage the edge of the lowermost can, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can about its point of engagement with the guide rail to bring the can into rolling position at the entrance of the runway.

9. The combination of a can labelling machine into and through which the cans are

rolled on a runway, a feed chute having its discharge end adjacent the entrance of the runway, said chute being inclined vertically and laterally of the runway to receive and advance the cans in end to end stacked relation, an abutment at one side of the lower end of the chute to engage the edge of the lowermost can, and a driven friction wheel above the end of the chute to engage and rotate said lowermost can about its point of engagement with the abutment to bring the can into rolling position at the entrance of the runway.

In testimony whereof I affix my signature.

KENNETH W. EMERSON.