Claims

1. In combination, an infeed apparatus and a container processing machine, the infeed apparatus providing containers to a process turret on the container processing machine, the infeed apparatus comprising:

   a conveyor for delivering containers at a linear pitch;

   an infeed turret for receiving the containers and increasing the pitch of the containers to the circular pitch of the infeed turret; and

   a series of at least two further circular turrets which receive and transfer the containers;

   ~~characterised in that~~wherein:

   ~~the final circular turret of the infeed apparatus is has the same number of pockets as the number of tools per tool group on the subsequent process turret of the container processing machine to which the cans are supplied by the infeed apparatus; and~~

   the exchange ratio from one turret to the next (T5:T4, T4:T3, T3:T2, T2:T1) of the infeed apparatus is discrete and no greater than 2:1.

2. The infeed apparatus of the combination according to claim 1, in which the supply of containers from the conveyor to the first turret (T5) is either at constant velocity or tangential to the turret.
3. The infeed apparatus of the combination according to claim 1 or claim 2, in which the series of rotating turrets (T5, T4, T3, T2, T1) are adapted to transfer the containers and to increase their circular pitch to that of the first processing turret on the container processing machine.
4. The infeed apparatus of the combination according to claim 3, in which each of the series of turrets (T5, T4, T3, T2, T1) has a selected number of pockets separated by a specific pitch and the number of pockets on the final turret (T1) of the infeed apparatus dictates the number of recirculations of the containers on the container processing machine in order to achieve the desired final output.
5. The infeed apparatus of the combination according to any one of claims 1 to 4, comprising gear and/or servo motor drives, which drive rotation of the turrets.
6. The infeed apparatus of the combination according to any one of claims 1 to 5, in which an increase in container pitch is either by a change in turret diameter,

or by adjusting both the number of turret pockets and the rotational speed of the turret.

7. The infeed apparatus of the combination according to any one of claims 1 to 6, in which the apparatus includes a series of 5 turrets.
8. The infeed apparatus of the combination according to any one of claims 1 to 7, including interfacing turret pockets for passing containers from one turret to the next.
9. The infeed apparatus of the combination according to claim 8, in which the trailing edge of one turret extends above the pitch circle diameter for trailing edge adjustment and the next turret has a local relief which allows passage of the extension.
10. A method of adjusting container pitch in an infeed apparatus for delivery to a container processing machine, the method comprising:
providing containers separated by a linear pitch;
receiving the containers on an infeed turret (T5) so that the containers are separated by a circular pitch;
passing the containers via a series of further circular turrets (T4, T3, T2, T1) to a container processing machine; and, optionally,
recirculating containers on the container processing machine;
~~characterised in that~~wherein the step of passing the containers in the infeed apparatus uses distinct exchange ratios (T5:T4, T4:T3, T3:T2, T2:T1) between adjacent turrets which are no greater than 2:1.
11. A method according to claim 10, including driving rotation of the turrets in the infeed apparatus by gear and/or servo motor drives.
12. A method according to claim 10 or claim 11, comprising increasing container pitch in the infeed apparatus either by a change in turret diameter, or by adjusting both the number of turret pockets and the rotational speed of the turret.