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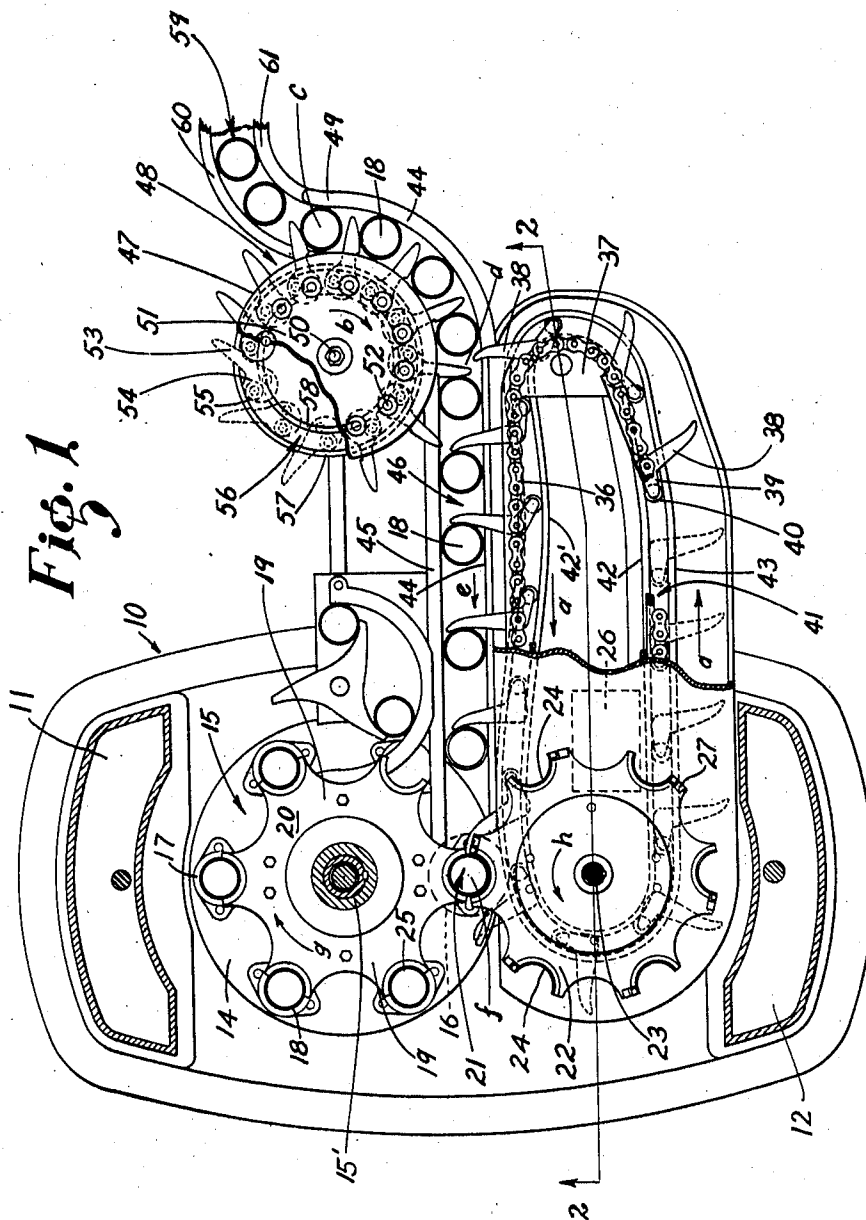
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VARIABLE SPEED CAN FEED

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VARIABLE SPEED CAN FEED

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3 Claims. (Cl. 198—22)

This invention relates to can making and double seaming machinery, and particularly pertains to a variable speed can feed.

In the manufacture of cans, and particularly in connection with the capping of cans of the double seam type, it is necessary to bring the can body and the can cap together under a double seaming head, and to form a hermetically tight seam at this point. When filled cans are capped under conditions which require high speed operation the contents of the can, if liquid, are liable to spill over the edges of the can, particularly if the can changes its direction of travel abruptly or is suddenly accelerated in speed. This last named condition often occurs since the run of filled cans leading to the double seaming machine is relatively slow with the cans moving ahead side by side or in close proximity to each other, and requiring that in order that the successive cans will be received at the seaming stations they shall be separated as they advance to reach a speed in synchronism to the speed of rotation of the usual rotary turret on a double seaming machine. In order to minimize these objectionable features of double seaming machines, applicant has provided a rotary turret carrying the cans to fixed seaming stations representing the first and second seaming operations, or representing a single station, at which point both operations of rolling a double seam are performed. In this machine it has been found desirable to provide a can feed mechanism which moves cans along a lineal path of travel to the seaming station. In view of the fact that the cans must be spaced apart suitably as they register with a seaming station, and the fact that they are spaced close together as they travel from the filling station, it is evident that an acceleration of speed of can travel must take place in order to space the cans apart suitably. It is the principal object of the present invention, therefore, to provide a can feed which is designed to receive the cans disposed in relatively close proximity to each other, and while traveling at a relatively slow speed, and to progressively and gradually accelerate the speed of the individual cans while they move to the seaming station, whereby they will be properly spaced and delivered to the seaming station in synchronism with the seaming operation, without danger of spilling the contents of the can.

The present invention contemplates the provision of a can seaming station, a can star wheel, and an intermediate lineal feed mechanism, whereby the cans will be removed from the star wheel and delivered to the seaming mechanism

along a lineal path of travel at a gradually accelerated speed from the star wheel to the seaming station.

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

Figure 1 is a view in horizontal section through a double seaming machine and its feed mechanism.

Fig. 2 is a view in transverse vertical section through the can feed mechanism as seen on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary view in vertical section showing an alternate form of star wheel arrangement different from that shown in Fig. 2.

Referring more particularly to the drawings, 10 indicates a base including the usual driving mechanism of a double seaming machine. Uprights 11 and 12 are mounted upon the base and carry an overhead housing structure 13. Mounted within the base and the overhead structure is a double seaming unit 14 which includes a turret 15 and double seaming heads 16. The double seaming heads are of any conventional design and are mounted upon the turret 15 which is carried upon a turret shaft 15'. The double seaming heads are intended to curl a double seam between a can and a cap of the sanitary type. Mounted beneath the seaming heads in corresponding number are lower chucks 17 upon which cans 18 may be positioned. Intermediate the seaming heads and the lower chucks is a spider 19 to receive the cans 18. The details of driving the turret 15 and the chucks 17 and a turret 20 carrying the lower chucks 17 are not a part of the present invention. The present invention is concerned with a can feed by which cans are delivered to a seaming station 21. This station occurs between the spider 19 and a spider 22. The spider 22 is mounted upon a shaft 23 provided with semicircular can recesses 24 corresponding with semicircular can recesses 25 carried by the spider 19. By reference to Fig. 1 it will be seen that when a recess 24 is in alignment with a recess 25 on a plane intersecting the shafts 15' and 23 a can will be embraced thereby to be rounded and for a double seaming operation. A can cap feed 26 is generally indicated in Fig. 1 of the drawings. This feed delivers cans to the turret 20, which cans are carried forwardly by lugs 27 on the turret to the seaming station 21.

The shaft 23 is driven through a suitable driving mechanism by a gear 28 secured at the lower end thereof. Mounted on the shaft 23 is a gear 29 which is in mesh with a gear 30 on a jack shaft 31. The jack shaft 31 carries a gear 32

in mesh with a gear 33. The gear 33 is mounted on a hub 34, the upper end of which carries a sprocket 35. Led around the sprocket 35 is a sprocket chain 36. This chain lies in a horizontal plane and is led around a cam 37. The cam 37 is spaced a distance from the shaft 23 in a horizontal plane and provides a path for the sprocket chain 36 which is not concentric with an axis. Pivotaly mounted upon the pins of the sprocket 36 and in equal spaced intervals to each other are can feed fingers 38. These fingers are fixed to swing with cam levers 39 which carry rollers 40 at their free ends. The rollers 40 travel along a cam track 41 between the cam rails 42 and 43. As shown in Fig. 1 of the drawings, the cam rails along the outer side of the path of travel of the chain 36 are spaced parallel to each other. On the opposite side a cam rail 42' is arcuately disposed out of normal alignment of the travel of the rollers 40. Extending longitudinally of the side rail 42' are rails 44 and 45 of a can runway 46. This runway extends longitudinally at right angles to a plane intersecting the axes of shafts 15' and 23. The rail 45 is substantially tangent to the circumferential edge 47 of a variable speed rotary star wheel 48. The rail 44 is parallel to the rail 45 and has an arcuate portion 49 concentric with the shaft 50 of the star wheel 48. The star wheel 48 includes an upper disc 51 carrying a plurality of vertical pivots 52 upon which are mounted feed fingers 53. The feed fingers are each fitted with an arm 54 carrying a roller 55. The roller 55 travels along a camway 56 defined by rails 57 and 58. The exact contour of the camway 56 is indicated by solid and dotted lines in Fig. 1 of the drawings and is designed to move the fingers 53 so that they will separate the cans and deliver them in proper order to the fingers 38 of the lineal can feed. A can runway 59 is provided including a pair of rails 60 and 61. These rails and the runway deliver cans from a suitable filling station not shown in the drawings.

In the form of the invention shown in Fig. 3 of the drawings the accelerating star wheel 48 is eliminated and a star wheel 62 is mounted directly upon a shaft 63 which occupies the bearing shown as receiving shaft 50 in Fig. 1. With this construction the star wheel 62 directly feeds the cans 18 to the feed chain 36 and the fingers 38.

In operation of the present invention the shafts 15' and 23 are driven in synchronism so that the arcuate pockets 24 and 25 will come to register in a plane which intersects the shafts 15' and 23. The chain 36 is driven at a predetermined speed through the gear 28, the shaft 23, the gears 29 and 30, the jack shaft 31 and the gears 32 and 33. The chain 36 will therefore be driven at a constant rate of speed. Referring to Fig. 1 of the drawings, it will be understood that the chain travels in the direction of the arrow *a*, and that the variable speed star wheel 48 travels in the direction of the arrow *b*. The variable speed star wheel will encounter the flow of cans passing along the can runway 59 and will cause the feed fingers 53 to enter between the cans. The fingers 53 of the accelerating star wheel 53 are moved to positions with their outer ends relatively close to each other along the opposite side of the star wheel from the path of travel of the cans around the disc 51 and along the rail 44. Due to the configuration of the cam groove 56, the fingers 53 will tend to spread apart so that they will span the space occupied by an incoming can, as indicated at *c* in Fig. 1 of the drawings.

Thereafter the cans will be moved along the arcuate length of the rail 44 to a point where the fingers 53 of the star wheel and the fingers 38 of the chain 36 will lie in substantially the same plane as indicated at *d*. At this particular point the finger on the chain is moving faster than the finger on the star wheel. This causes the fingers 38 on the chain to accelerate the speed of the can while the finger 53 on the star wheel lags behind to permit the finger 38 to pick up the can and carry it forwardly. The shape of the chain cam 37 is such as to cause the finger 38 at point *d* to move laterally and forwardly of the path of travel of the cans so that it will be inserted between two cans and will then accelerate to overtake a can delivered by a finger 53 of the star wheel. As the finger 38 engages the can at point *d* the roller 40 on the lever 39 of this particular finger will pass along the cam track 42', thus tending to cause the tip of the finger 38 to move at a relatively slower rate of speed than the constant speed of the chain 36. As the chain advances in the direction of the arrow *a* the rollers 40 will move outwardly toward the chain, and this will swing the fingers 38 forwardly with the can and in the direction of the arrow *e*. This gradual movement will accelerate the speed of the cans 18 along and between the rails 44 and 45 to the seaming station *f*. Here a cap will be delivered to the can and the spiders 15 and 22 will act to hold the can "in round" so that the double seaming operation may be performed most efficiently. The double seaming spider 15 travels in the direction of the arrow *g* and the spider 22 travels in the direction of the arrow *h*.

It will thus be seen that by the mechanism here disclosed it is possible to feed open filled cans into a can double seaming machine from a relatively slow flowing run of cans to a high speed double seaming machine in a manner to gradually accelerate the speed of the cans without disturbing their contents sufficiently to cause them to spill.

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

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

1. An accelerating can feed, comprising a table over which cans may travel in an upright position from a flow of cans to a can receiving station, a sprocket disposed adjacent to said can receiving station and lying in a horizontal plane, a chain cam disposed in said horizontal plane adjacent to the flow of cans, a feed chain led around said sprocket and said cam whereby a run of the chain will be in a lineal path of travel, thereafter passing along a path of travel concentric with the axis of the sprocket at one end and along a non-circular path around the cam at its opposite end, can engaging fingers pivotally mounted upon the chain and carried therewith and being disposed in a horizontal plane, cam levers connected with said fingers, each carrying a cam roller, and a cam track along the path of travel of said rollers, whereby the free ends of the can engaging fingers will move at accelerated rates of speed from the cam to the sprocket.

2. The structure of claim 1 including a star wheel interposed between the flow of cans and the path along which they are carried by the can

engaging fingers and whereby the cans will be fed to the fingers in synchronism.

3. The structure of claim 1 including a star wheel interposed between the flow of cans and the path along which they are carried by the can engaging fingers and whereby the cans will be fed to the fingers in synchronism, said star wheel including a rotary body member, a plurality of separately swinging feed fingers mounted circumferentially thereof, levers, one fixed to each of said 10

fingers, a roller carried by each of said levers and a cam track along which the rollers travel and whereby the free ends of the feed fingers will be caused to move as they advance and at differential speeds from the constant speed of rotation of the star wheel, whereby the cans will be separated and an accelerated speed of travel will be imparted to them as they are delivered to the can engaging fingers.

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