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[54] **PATTY MAKING MACHINE**
19 Claims, 5 Drawing Figs.

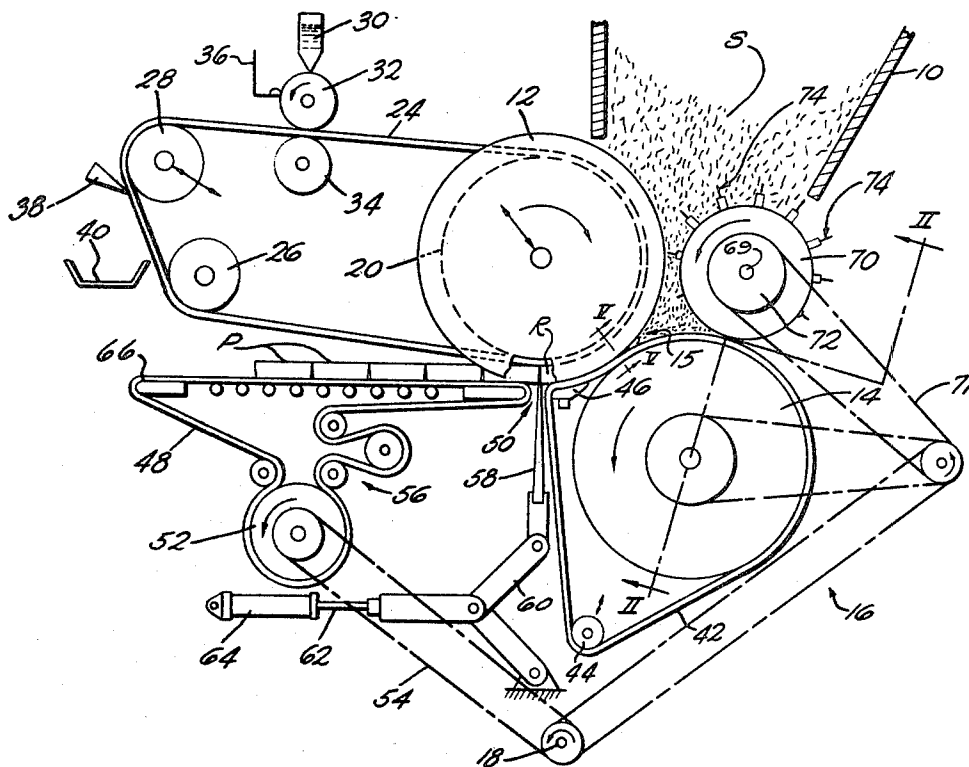
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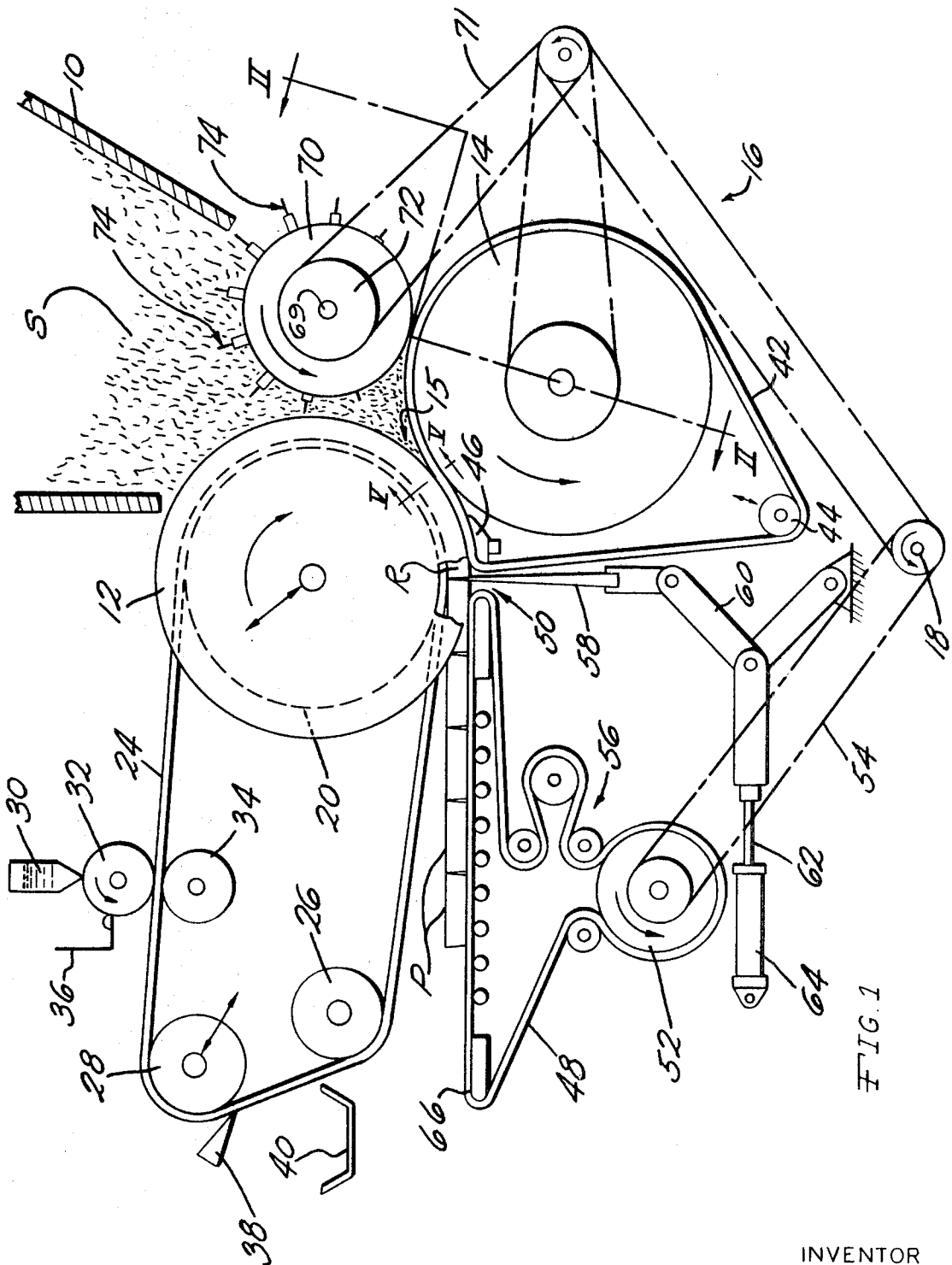
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 14; 17/32; 18/4 B, 9, 10; 25/105, 107; 107/4, 5, 8,
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ABSTRACT: Apparatus and method for automatically forming food products, such as, potato patties from shreds, the shreds being withdrawn from a hopper onto two endless belts which pass into a nip formed by counterrotating compacting rollers, one of which has a compacting recess formed in its circumference. The ribbon formed by the compaction is cut into patties by a reciprocating knife cutting into the recess. In an alternate embodiment the knife is positioned to bear against the belt onto which the ribbon drops after being formed in the compacting stage. To positively feed the shreds into the compacting rollers, a pin wheel having rows of pins eccentrically mounted with respect to the axis of rotation of the wheel is positioned adjacent to the compacting rollers.





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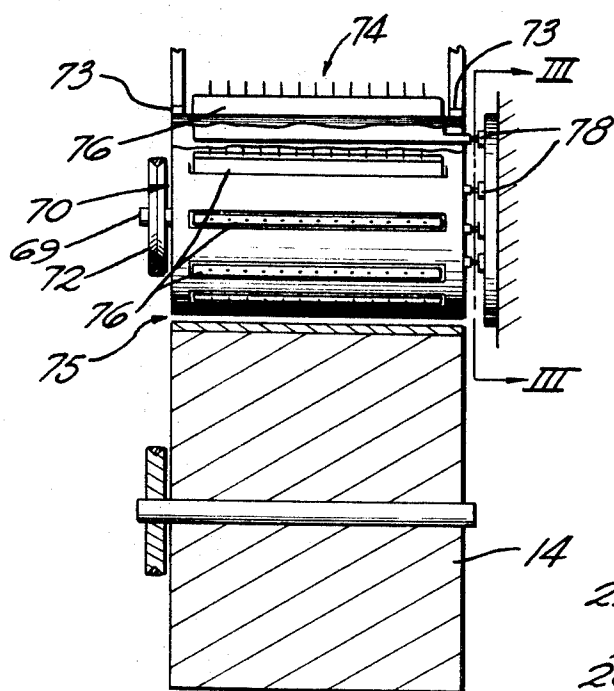


FIG. 2

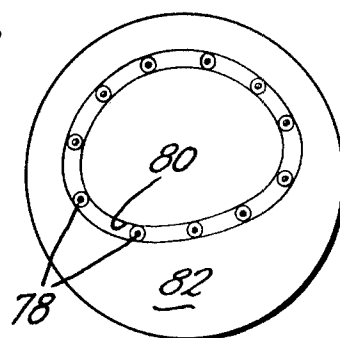


FIG. 3

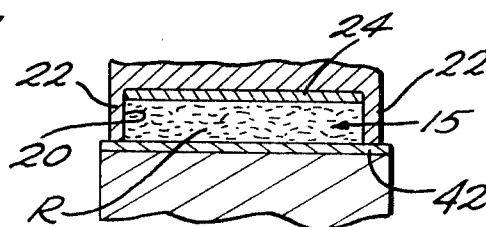


FIG. 5

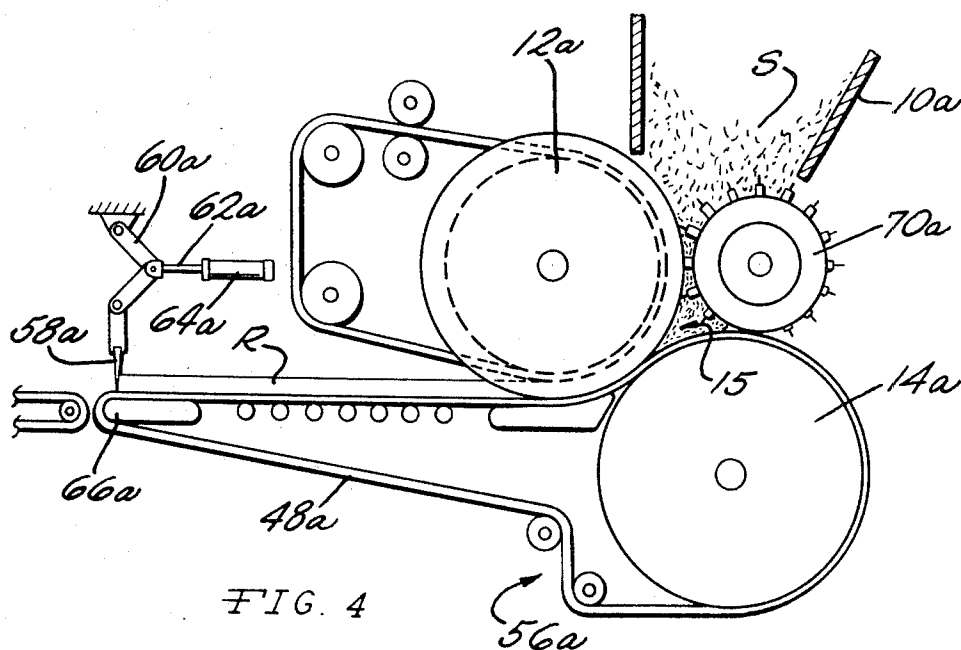


FIG. 4

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PATTY MAKING MACHINE

BACKGROUND OF THE INVENTION

In the making of potato patties from potato shreds, there always has been a problem in constructing an apparatus which would produce the patties automatically and of the same quality as those produced by hand or by processes which were not complete automated. Particularly, there has been a problem in providing uniform feed of the potato shreds into the compacting means. Failure to feed the shreds uniformly into the compacting means results in voids formed in the resulting patties.

Still another difficulty in the preparation of the patties is the need for a continuous, rather than batch, process to reduce production costs.

SUMMARY OF INVENTION

The invention relates to a machine for automatically forming potato patties of uniform quality. Specifically, the invention provides apparatus utilized in preparation of potato patties comprising a hopper; a first endless belt positioned to pass underneath the hopper; means for feeding shreds of potatoes from the hopper onto the belts; means for compacting the shreds on the belt into a compact ribbon; a second endless belt; means for transferring the ribbon from the first belt to the second belt; a reciprocating knife for cutting the ribbon into patties; and means for reciprocating the knife.

Accordingly, it is an object of the invention to provide apparatus and a method for automatically forming food products such as potato patties from potato shreds.

It is a further object of the invention to provide an apparatus and a method of the above character wherein shreds are uniformly fed into the compacting means so as to eliminate voids.

It is still another object of the invention to provide an apparatus and a method of the above character which will provide the potato patties continuously.

Other objects and advantages will become apparent upon reference to the following drawings and detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic elevational view, partly in section, of the apparatus constructed in accordance with the invention;

FIG. 2 is a fragmentary sectional view, partially broken away, taken along the line II-II of FIG. 1;

FIG. 3 is a sectional view taken along the line III-III of FIG. 2;

FIG. 4 is an elevational view similar to FIG. 1 but showing an alternate embodiment; and

FIG. 5 is a sectional view taken along the line V-V of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention concerns the automatic production of food products such as potato patties from potato shreds and specifically the preparation of the patties prior to the cooking thereof.

In accordance with the invention, potatoes are shredded into short strips S which are fed into a hopper 10, the hopper being positioned above two coacting counterrotating compacting rollers 12 and 14. The rollers are conventionally mounted so that roller 12 can be adjusted with respect to roller 14, thereby altering the size of the nip between the two rollers. The direction of rotation of the two rollers is as shown by the arrows in FIG. 1, the rotation serving to draw the shreds into a nip 15 wherein they are compacted. The roller 14 is driven by conventional means such as the series of pulleys and belts designated by the numeral 16, the whole series being driven by a drive shaft 18. The roller 12 is driven from roller 14 by conventional gears, not shown. To define the nip 15 so as to provide a compacting space, the roller 12 is provided

with a pulleylike recess 20 around its entire circumference. The potato patty is formed in recess 20 with the sidewalls 22 of the recess 20 (FIG. 5) limiting the width of the patty. A conveying surface for carrying the shreds and the patties into and away from, respectively, the nip 15, is formed by a first endless belt 24 which passes around a portion of the circumference defined by the recess 20, under the hopper 10 and through the nip 15. The belt 24 rises gradually from the horizontal after leaving the roller 12, passes around a freewheeling pulley 26 and a conventional takeup roller 28. The slack in the belt 24 is adjusted by roller 28 in the nip 15. A releasing agent 30 is conventionally applied to a felt roller 32 pressing on the belt 24 by means of a backup roller 34 so that the belt 24 is lubricated with a release agent. An adjustable doctoring blade 36 controls the amount of releasing agent applied to the belt. A scraper blade 38 is positioned between the rollers 26 and 28 to remove any shreds from the belt prior to its returning to hopper 10. The shreds scraped thereby fall into a bin 40.

A second endless belt 42 passes around a portion of the circumference of the roller 14, under the hopper 10 and into the nip 15. The belt 42 is wider than the belt 24 (FIG. 5), so that the sidewalls 22 of the roller 12 can press against the belt 42 and confine the compacting area for the patties. The belt 42 passes around shoe 46 and a conventional takeup pulley 44 similar to pulley 28. The pulley 44 controls the slack in belt 42. The stripping shoe 46 is positioned below the roller 12 so that the belt 42 passes over and around the shoe 46 at an acute angle. The shoe 46 functions to hold the ribbon R in the recess 20 after the compacting step. A third belt 48 is positioned beneath belt 24 and adjacent to the shoe 46, leaving a gap 50 therebetween. The belt 48 is passed over conventional shoes and supporting rollers to carry the potato patties formed from the ribbon horizontally away. The belt 48 passes under the point where the potato ribbon first starts to separate from the belt 24. Due to the use of release agent 30, the patties can drop by gravity from the belt 24. The belt 48 is driven by a conventional pulley 52 which in turn is driven by a belt 54 operating from the drive shaft 18. To adjust the slack in the belt 48, conventional takeup pulleys 56 are utilized.

A knife 58 is mounted for reciprocation into the gap 50 formed between the belts 42 and 48, the knife being sufficiently narrow as to pass into the recess 20 formed by the sidewalls 22 of the roller 12. The knife presses against the belt 24 at a point where the belt is still on and just prior to its leaving the surface of the recess 20 to sever the ribbon into patties. To reciprocate the knife, a conventional rocker arm assembly 60 is moved by a piston rod 62 actuated by a fluid cylinder 64, which cylinder can be conventionally operated either hydraulically or pneumatically. The patties P are then carried by the belt 48 and discharged to a point 66 where the patties are further processed, such as by cooking.

A pinwheel 70 containing radially projecting pins 74 is positioned below the hopper and adjacent to both the rollers 12 and 14. The wheel 70 is rotatably driven about a shaft 69 which thus forms the wheel's axis of rotation. A belt 71 drives pin wheel 70 through pulley 72 in a direction of the arrow in FIG. 1. The belt 71 is connected to the same drive system which drives the lower roller 14. A sealing surface 73 on the hopper 12, bearing against the surface of the rotating wheel 70 (FIG. 2) to contain the shreds within hopper 12. The pinwheel 70 is positioned as close to the nip 15 as possible, so as to positively force the potato shreds into the nip 15 to start the compacting of the shreds against the belt 24. To accommodate this close positioning of the pinwheel 70, the pins 74 are mounted so that they are drawn inwardly as they approach wheel 14. To this end, the pins 74 are mounted in rows on the end of radially disposed plates 76, one row of pins to each plate, the plates 76 are slidably mounted in radially extending grooves within the wheel 70 and are in turn connected to followers 78 which are constrained to move in a generally elliptical track 80. The center of track 80 is displaced from the axis of rotation of the pinwheel 70. Track 80 is positioned in a stationary

plate 82 which is independent from the pinwheel 70. The eccentric mounting thus provides that the pins 74 will project out into the hopper 10 to engage the shreds S and drive them toward the nip 15, and will be retracted back into the wheel 70 as the pins 74 approach the nip 15 between the pinwheel 70 and the roller 14 so as to clear the belt 42. Although the rows of pins 74 are disclosed in the drawings as being one row to a plate, each row being radially disposed about shaft 69, it will be apparent that alternate arrangements of the pins can be obtained, such as an arrangement wherein the rows are not radially disposed. Other camming arrangements are also possible within the scope of the invention.

FIG. 4 illustrates an alternate embodiment in the apparatus providing the formation of the potato patties, wherein the reciprocating knife does not press against the compacting rollers and the third belt is eliminated. The parts in the embodiment which correspond to those previously described have the same reference numerals to which the distinguishing suffix "a" has been added. For the sake of brevity, a description of these parts will not be repeated. In the embodiment, the belts 42 and 48 have been replaced by a single belt 48a which passes through the nip 15 around roller 14a, around shoe 66a and takeup rollers 56a. The belt 48a thus moves through the nip 15 and carries the ribbon R to shoe 66a. Takeup pulleys 56a control the slack in belt 48a. To cut the ribbon R into patties, a knife 58a is positioned above shoe 66a. The knife is mounted for reciprocal movement against the belt 48a as it passes over the shoe 66a. As in the case of the previous embodiment, rocker arms 60a reciprocate the knife in accordance with the reciprocation of a piston rod 62a actuated by a piston 64a.

Other modifications of the apparatus disclosed herein are possible within the scope of the invention. For example, the shape of the recess 20 can be such that the sides of the ribbon R formed therein are more rounded. However, the walls 22 of the recess 20 must always be other than downwardly converging so that the ribbon R will drop out of the recess and off the belt 24 after it is formed.

In operation of the first embodiment, the food product is shredded and fed into hopper 10. In the lower portion of the hopper 10, the shreds will be fed with positive action into the nip 15 between rollers 14 and 12 and into recess 20. The rollers 14 and 12 compact the shreds within the recess 20 and form a ribbon R. Upon leaving the nip 15, the ribbon R is cut into patties with knife blade 58 bearing against roller 12. The patties P are then picked up by belt 48 as the patties separate from belt 24.

The operation of the second embodiment is the same as above described except that the ribbon R is not cut until after it separates from belt 24a.

Reasonable variation and modification are possible within the scope of the foregoing disclosure and drawings without departing from the spirit of the invention.

I claim:

1. Apparatus utilized in the preparation of food product patties, said apparatus comprising: a hopper; a endless belt positioned to pass underneath said hopper; means including pins driven downwardly toward said belt for feeding shreds of a food product from said hopper onto said belt; a pair of coacting rollers positioned on each side of said endless belt for compacting said shreds on said belt into a compact ribbon; a conveyor means; means for transferring the ribbon from said belt to said conveyor means; and means for cutting said ribbon into patties.

2. The apparatus as defined in claim 1, wherein compacting means includes a pair of coating rollers, said first endless belt passing between them; said feeding means is positioned under said hopper adjacent to said pair of rollers.

3. The apparatus as defined in claim 2, wherein said rollers are counterrotating and adjustably spaced apart to form an adjustable nip, said first belt passing through said nip with said shreds thereon; and further including a second endless belt positioned to pass under said hopper and through said nip.

4. The apparatus as defined in claim 3 wherein said first mentioned belt passes around a portion of the circumference of one of said rollers, and said second belt passes around a portion of the circumference of the other of said rollers.

5. The apparatus as defined in claim 4, wherein one of said rollers has a circumferential recess defined by radially extending sidewalls; said roller sidewalls abutting said second belt; said first mentioned belt passes over said one roller within said recess; and said cutting means includes a reciprocating knife.

6. The apparatus as defined in claim 5, wherein said transferring means includes a releasing agent applied to said first mentioned belt.

7. The apparatus as defined in claim 5, wherein said knife is positioned so that its cutting blade passes into said recess and contacts said first mentioned belt when it is within said recess of said one roller, and further including means for reciprocating said knife.

8. The apparatus as defined in claim 2, wherein said cutting means includes a knife positioned so that its cutting blade contacts said second belt, and further including means for reciprocating said knife.

9. The apparatus as defined in claim 1, wherein said feeding means includes a pinwheel rotatably driven about an axis of rotation, said pins engaging the shreds and feeding them to said first mentioned belt.

10. The apparatus as defined in claim 9, wherein said pins are mounted for radial movement by cam means comprising a generally elliptical track and followers operatively connected to said pins and engaging said track, said track being offcentered with respect to the axis of rotation of said wheel.

11. The apparatus as defined in claim 10, wherein said pins are mounted on a plurality of plates each of which are in turn slidably mounted in radial slots in said wheel, and said plates are connected to said followers; and further including means for rotatably driving said wheel.

12. The apparatus as defined in claim 11, wherein said pins are mounted in rows, one row to each plate.

13. A pinwheel for feeding potato shreds into compacting means, said wheel comprising an axle; means for rotatably mounting said wheel on said axle; a plurality of pins mounted within said wheel for radial movement therein; a track mounted eccentrically with respect to said axle and fixed relative to said wheel; and means for operatively connecting said pins to said track whereby the radial movement of said pins in said wheel is determined and controlled by said track as said wheel is rotated about said axle.

14. The wheel as defined in claim 13 wherein said track is elliptical.

15. The wheel as defined in claim 13 wherein said pins are mounted in rows on plates, said plates are slidably mounted within radial slots in said wheel, each of said plates being connected to a follower, said followers being movably confined in said track so as to be engaged thereby.

16. The wheel as defined in claim 15 wherein said rows are mounted one row to a plate.

17. An apparatus for continuously forming food patties, said apparatus comprising:

a pair of adjacent compacting rolls mounted for counter rotation and forming a nip therebetween;

a recess formed in the circumference of one of said rolls;

a first belt passing around a portion of the circumference of said one roll and within said recess;

a second belt passing around a portion of the circumference of the other of said pair of rolls;

hopper means communicating with the nip of said compacting rollers; and means to force said food product within said hopper into the nip of said rollers.

18. An apparatus according to claim 17 wherein said forcing means includes a roller having radially disposed pins.

19. An apparatus according to claim 17 wherein said second belt forms a conveyor for carrying compacted food products away from said nip.