April 9, 1963 B. STAHMER 3,084,730

ROTATING PUNCHING ROLL FOR PUNCHING POTATO CHIPS

Filed March 6, 1959 2 Sheets-Sheet 1

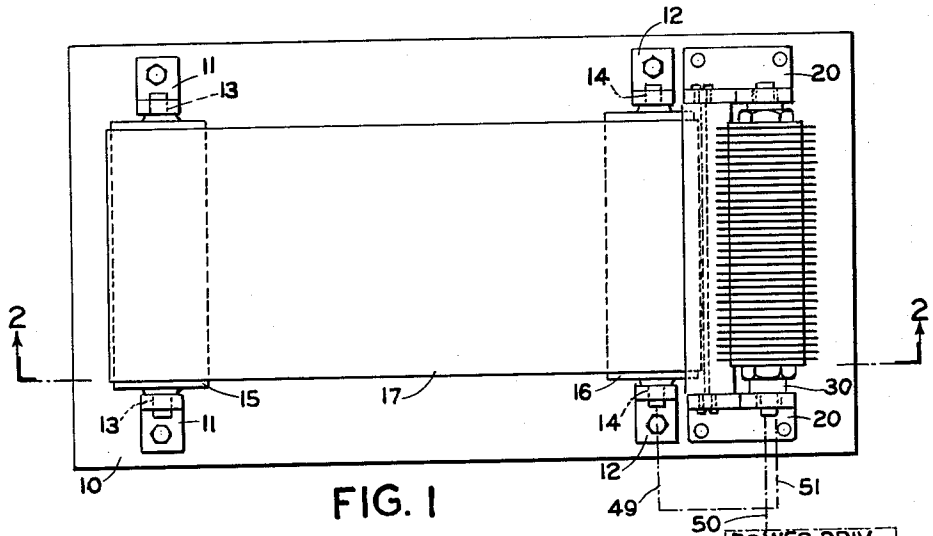


FIG. 1

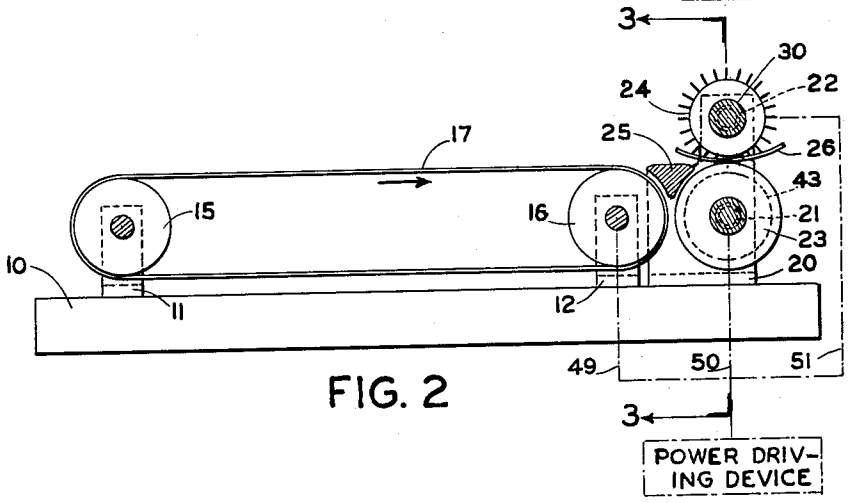


FIG. 2

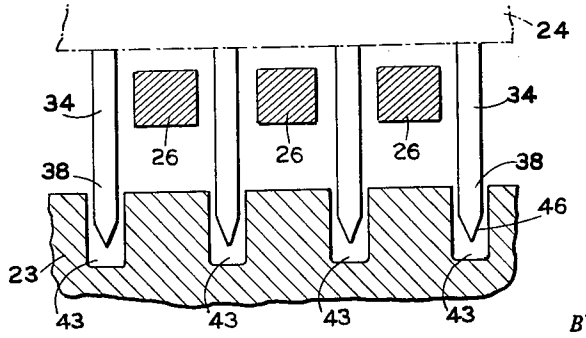


FIG. 3

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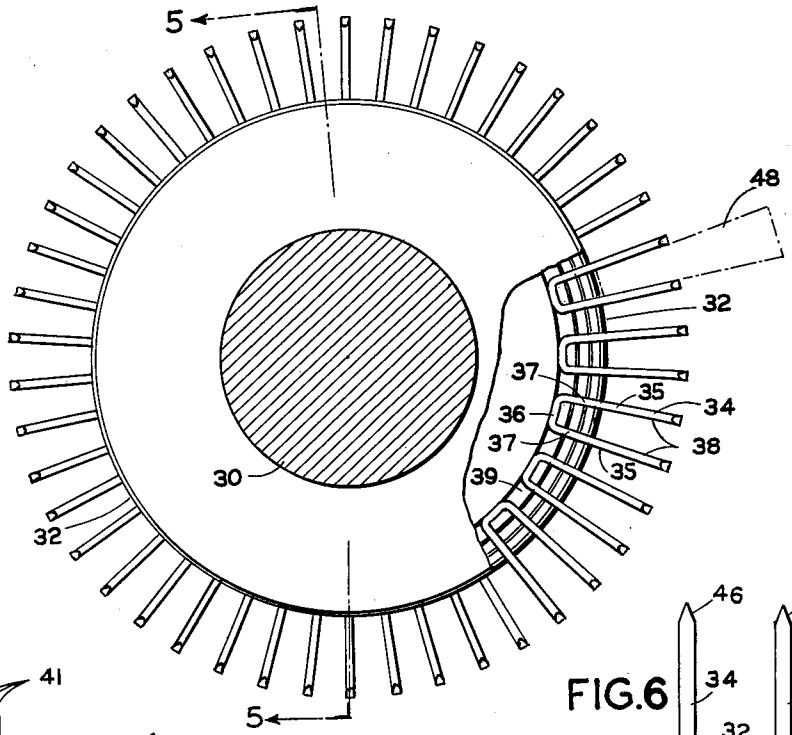


FIG.4

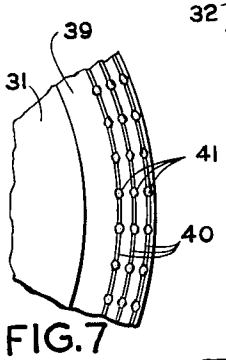


FIG.7

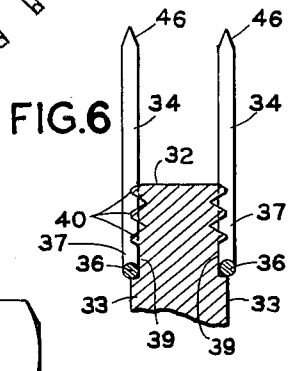


FIG.6

FIG.5

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ROTATING PUNCHING ROLL FOR PUNCHING POTATO CHIPS

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4 Claims. (Cl. 146—1)

This invention relates to a rotating punching roll for punching raw potato chips.

This application is a continuation-in-part of my application Serial Number 666,441, filed June 18, 1957, now abandoned.

It is an object of this invention to provide a rotating punching roll for punching raw potato chips.

Another object of the invention is to provide means for anchoring a plurality of punching means in the rotating punching roll.

Another object of the invention is the provision of a plurality of substantially U-shaped punching means which may be positively anchored to the rotating punching roll.

Another object of the invention is the plurality of discs between which the punching means may be anchored.

Another object of the invention is the provision of the punching means having chisel-like piercing ends.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a plan view of a machine for punching raw potato chips having a rotating punching roll embodying the features of the invention;

FIGURE 2 is a side view of the machine in FIGURE 1 taken along the line 2—2 thereof;

FIGURE 3 is a fragmentary and enlarged view showing primarily the punching means;

FIGURE 4 is a side view of the discs which hold the punching means, one of said discs being broken away to illustrate the features of the invention, the view being taken along the line 4—4 of FIGURE 5 and shows a shaft upon which the discs are mounted in section;

FIGURE 5 is a cross-sectional view of the rotating punching roll, taken along the line 5—5 of FIGURE 4, showing primarily the arrangement of the disc and the punching means anchored between the disc;

FIGURE 6 is an enlarged fragmentary view of a portion of a disc showing two punching means mounted thereagainst, and

FIGURE 7 is an enlarged fragmentary view of a disc showing primarily the inwardly extending clamping recesses in which the punching means are mounted.

The potato chip rotating piercing machine in which the present invention may be embodied comprises a base 10 having an upper surface normally horizontally disposed. Mounted on top of the upper surface of the base 10 are two sets of bearing brackets 11 and 12. The set of bearing brackets 11 is provided with bearings 13 therein to receive the ends of a shaft upon which is mounted a roller 15. The set of bearing brackets 12 is provided with bearings 14 therein to receive the ends of a shaft upon which is mounted a roller 16. An endless belt 17 is arranged to travel around the two rollers 15 and 16. The raw potato chips which are to be punched are delivered from the slicing machine to the endless belt 17.

Also mounted on the base 10 is a set of bearing brackets 20. Mounted in the lower portion of the set of bearing brackets 20 are bearings 21 for receiving the ends of the shaft upon which a bottom roller 23 is mounted. Provided in the upper portion of the set of bearing brackets 20 are two bearings 22 for receiving the ends of a shaft 30 upon which a punching roller 24 is mounted. A conveyor bridge 25 comprising substantially a V-shaped

member is mounted between the bottom roller 23 and the conveyor belt 17 where is passes over the roller 16. The conveyor bridge 25 may be anchored to the bearing brackets 20 by any suitable means. Disposed between the punching roller 24 and the bottom roller 23 is a scraper grill 26 which is employed to remove the raw pierced potato chips from the punching roller as the potato chips pass between the punching roller and the bottom roller 23. The scraper grill may be mounted to the bearing brackets 20 by any suitable means.

A plurality of circular discs 31 are mounted one against the other on the shaft 30. The discs have an outer surface 32 and side surfaces 33. In this invention the punching means for piercing the potato chips comprises a plurality of substantially U-shaped punching elements 34 which are circumferentially spaced apart and mounted in circumferential rows between the adjacent side surfaces 33 of the discs 31. Each of the substantially U-shaped punching elements comprise two side legs 35 and a closed bottom 36 comprising an annularly extending anchoring portion. Each of the legs 35 comprising an inwardly extending anchoring portion 37 and a piercing portion 38. The side surfaces 33 of the discs 31 have a circumferential groove 39 of a diameter less than the diameter of the outside surfaces 32 of the discs. The side surfaces 33 of the discs also have a plurality of circumferential ribs 40 radially spaced apart and disposed between the groove 39 and the outer surface 32 of the discs. The ribs 40 have at circumferentially spaced intervals inwardly extending clamping recesses 41 extending thereacross; see FIGURE 7. The inwardly extending clamping recesses 41 may be provided in the ribs by a suitable die sinking operation whereby a plurality of radially extending round tools or bead are sunk or pressed into the ribs which flattens the top of the ribs. The inwardly extending clamping recesses 41 on the ribs 40 receive the inwardly extending anchoring portions 37 of the legs and the groove 39 receives the bottom 36 between the legs. The shaft 30 is provided with two clamping nuts 42 which press the adjacent side surfaces 33 of the discs towards each other and thereby clamp the inwardly extending anchoring portions 37 of the legs in the inwardly extending clamping recesses 41 and clamp the bottom 36 between the legs in the groove 39.

As shown in FIGURE 5, the piercing portions 38 may be provided with chisel-like cutting ends 46 by rotating the punching roll with the ends of the piercing portions held against a grinder 47. Just before the clamping nuts 42 are turned completely tight, the piercing portions 38 of the punching means may be aligned in rows crosswise of the punching roll by inserting an alignment straight edge tool 48 between the two legs. After the piercing portions 38 are aligned in rows, the nuts 42 may be finally tightened, after which the straight edge tool 48 is removed. The anchoring portions 37 of the punching means are held tightly between the discs. In the clamped position of the discs, there is a small clearance between the discs, which allows the clamping recesses 41 to tightly engage the anchoring portions 37.

The rolls 16, 23 and 24 may be driven by any suitable power driving device through power connections indicated by the dot-dash lines 49, 50 and 51, see FIGURES 1 and 2.

In operation, the raw potato chips on the conveyor belt 17 travel with the conveyor belt and are delivered to the conveyor bridge 25 where they are pushed thereacross into the two rolls 23 and 24 at which location the piercing means punch holes in the raw potato chips. The ends of the piercing means extend into circumferential grooves 43 provided in the bottom roller 23, see FIGURE 3. The scraper grill 26

has bar members extending between the punching means so that the potato chips are removed from the punching roller as they pass between the two rollers 23 and 24. The FIGURES 4 and 5 are drawn substantially to scale. Preferably the punching means are in the neighborhood of 1/16 inch in diameter and are spaced in the neighborhood of 3/8 inch apart in both the circumferential direction and the cross-wise direction.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. Rotating punching means comprising, a rotating shaft, a plurality of rotating discs mounted on said shaft, said discs having an outer surface and having adjacent side surface means facing each other with a small clearance therebetween at the outer periphery, a plurality of punching means circumferentially spaced apart and mounted between said adjacent side surface means of said discs, each said punching means having anchoring portion means disposed between adjacent side surface means of said discs and having piercing portion means projecting outwardly from said discs, each said anchoring portion means having an inwardly extending anchoring portion and an annularly extending anchoring portion, said adjacent side surface means of said discs having circumferential groove means of a diameter less than the diameter of the outer surface of said discs, said adjacent side surface means of said discs having circumferential ribs radially spaced apart and disposed between said groove means and the outer surface of said discs, said ribs having at circumferentially spaced intervals inwardly extending clamping surface means extending thereacross, said inwardly extending clamping surface means on said ribs receiving said inwardly extending anchoring portions of said punching means and said groove means receiving said annularly extending anchoring portions of said punching means, and means on said shaft pressing the adjacent side surface means of said disc towards each other and clampingly engaging said inwardly extending anchoring portions of said punching means in said inwardly extending clamping surface means and clamping said annularly extending anchoring portions in said groove means.

2. Rotating punching means comprising, a rotating shaft, a plurality of rotating discs mounted on said shaft, said discs having an outer surface and having adjacent side surface means facing each other with a small clearance therebetween at the other periphery, a plurality of substantially U-shaped punching means circumferentially spaced apart and mounted between said adjacent side surface means of said discs, each said substantially U-shaped punching means comprising two side legs and a closed bottom between said legs, each said side legs having an inwardly extending anchoring portion disposed between adjacent side surface means of said discs and having a piercing portion projecting outwardly from said discs, said bottom comprising an annularly extending anchoring portion, said adjacent side surface means of said discs having circumferential groove means of a diameter less than the diameter of the outer surface of said discs, said adjacent side surface means of said discs having circumferential ribs radially spaced apart and disposed between said groove means and the outer surface of said discs, said ribs having at circumferentially spaced intervals inwardly extending clamping recesses extending thereacross, said inwardly extending clamping recesses on said ribs receiving said inwardly extending anchoring portions of said legs and said groove means receiving said bottom between said legs, and means on said shaft pressing the adjacent side surface means of said disc towards each other and clampingly engaging said inwardly extending anchoring portions of said legs in said inwardly extending clamping recesses and clampingly engaging said bottom between said legs in said groove means.

3. In a machine for piercing raw potato chips from one side of the chip toward the other side thereof comprising, a rotating shaft, a plurality of rotating discs mounted on said shaft, said discs having adjacent side surface means facing each other with a small clearance therebetween at the other periphery, a plurality of punching means circumferentially spaced apart in circumferential rows and mounted between said adjacent side surface means of said discs, each said punching means having anchoring portion means disposed between adjacent side surface means of said discs and having piercing portion means projecting outwardly from said discs, each said anchoring portion means having an inwardly extending anchoring portion and an angularly extending anchoring portion, said adjacent side surface means of said discs having clamping surface means to receive said anchoring portion means of said punching means, each said clamping surface means having an inwardly extending clamping surface and an annularly extending clamping surface to receive and clampingly engage respectively the inwardly extending anchoring portion and the annularly extending anchoring portion of said punching means, means on said shaft pressing the adjacent side surface means of said discs towards each other and clamping said anchoring portion means of said punching means between said clamping surface means, a rotating supporting surface for supporting said raw potato chips, said rotating supporting surface having circumferentially extending grooves therearound, said piercing portion means of said circumferential rows of punching means piercing said raw chips supported on said supporting surface and projecting into said grooves, and scraper means to remove the pierced raw potato chips from said punching means.

4. In a machine for piercing raw potato chips from one side of the chip toward the other side thereof comprising, a rotating shaft, a plurality of rotating discs mounted on said shaft, said discs having adjacent side surface means facing each other and having a small clearance therebetween at the other periphery, a plurality of punching means circumferentially spaced apart in circumferential rows and mounted between said adjacent side surface means of said discs, each said punching means having anchoring portion means disposed between adjacent side surface means of said discs and having piercing portion means projecting outwardly from said discs, each said anchoring portion means having an inwardly extending anchoring portion and an annularly extending anchoring portion, said adjacent side surface means of said discs having clamping surface means to receive said anchoring portion means of said punching means, each said clamping surface means having an inwardly extending clamping surface and an annularly extending clamping surface to receive and clampingly engage respectively the inwardly extending anchoring portion and the annularly extending anchoring portion of said punching means, means on said shaft pressing the adjacent side surface means of said discs toward each other and clamping said anchoring portion means of said punching means between said clamping surface means, a rotating supporting surface for supporting said raw potato chips, said rotating supporting surface having circumferentially extending grooves therearound, said piercing portion means of said circumferential rows of punching means piercing said raw chips supported on said supporting surface and projecting into said grooves, scraper means to remove the pierced raw potato chips

from said punching means, and means to deliver raw potato chips to said rotating supporting surface.

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