

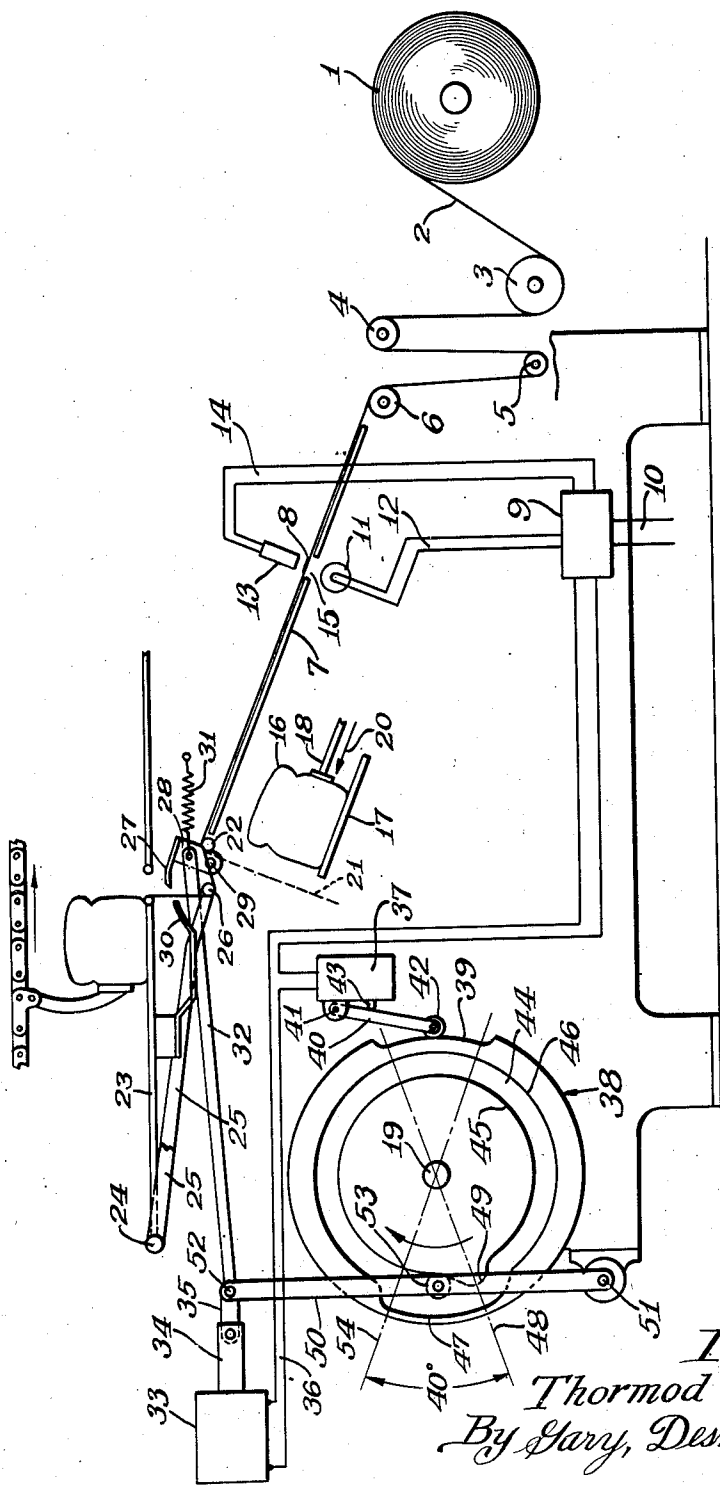
March 18, 1958

T. JENSEN

2,826,882

WRAPPER CUTTING MACHINE

Filed Dec. 4, 1956



Inventor:
Thormod Jensen
By Garry, Desmond & Parker
Attys.

1

2,826,882

WRAPPER CUTTING MACHINE

Thormod Jensen, New York, N. Y., assignor to Pollock Paper Corporation, Dallas, Tex., a corporation of Texas

Application December 4, 1956, Serial No. 626,204

7 Claims. (Cl. 53—66)

This invention relates to improvements in a machine for wrapping bread or other more or less irregular objects, and refers particularly to a mechanism for cutting a continuously fed web into individual wrappers in timed relationship with the feeding of objects to be wrapped.

One of the important features of the present invention resides in a wrapper cutter which is normally caused to function by a signal sent by a photoelectric cell but which, if excessively large or excessively small objects are wrapped, is caused to operate mechanically.

Briefly described, the invention contemplates a wrapping machine wherein a web of wrapping material is drawn forwardly by the article to be wrapped, the web carrying spaced substantially opaque dots which normally control a photoelectric cell, which in turn actuates a cutter knife for severing the web into individual wrappers, the device also contemplating a cam mechanism which may independently actuate the cutter knife when the article being wrapped draws greater or less than predetermined maximum or minimum lengths of wrappers.

Other objects, advantages and features of the present invention will be apparent from the accompanying drawing and following detailed description.

Referring in detail to the drawing, 1 indicates a roll of wrapping material which in the case of wrapping bread, may be waxed paper, cellophane or the like. A web 2 may be drawn continuously from roll 1 and may be passed around a guide roller 3; around a second guide roller 4; around a floating roller 5 which functions as a web-tensioning means; around guide roller 6 and passed to the upper surface of table 7.

The web 2 carries a plurality of spaced substantially opaque signal dots 8 which are spaced along the length of the web a distance from each other substantially equal to the length of the individual wrappers into which the web is to be severed, as will be hereinafter more fully described. A control box 9 may be positioned adjacent table 7 and may be connected by conductors 10 to a suitable source of electric power (not shown). A light source 11 is connected to box 9 by conductors 12 and a photoelectric cell 13 is connected to said box by conductors 14. The table 7 is provided with an aperture 15 whereby light from light source 11 may project there-through, the dots 8 being adapted to travel over said aperture and periodically block the light normally transmitted to the photoelectric cell. The function of the photoelectric cell will be hereinafter more fully described.

The general type of wrapping machine with which the present invention is particularly usable is conventional and is shown and described in United States Patents 2,385,706, granted September 25, 1945, and 2,611,224, granted September 23, 1952, and is shown diagrammatically herein. The patents aforesaid are essentially bread wrapping machines and for purposes of illustrating the operation of the present invention, it will be described in conjunction with use in wrapping loaves of bread.

In the operation of automatically wrapping bread, it is desirable that the advertising or design matter carried by each wrapper be disposed over the central upper portion of the loaf and in view of the fact that the loaves vary somewhat in girth, such variation is accommodated by the extent of the overlap. Hence, the present ma-

2

chine is so constructed that within the usual variation of girth of the bread, the wrapper advertising matter, etc. will be centrally located with respect to the loaf and the variations will appear in the degree of overlapping of the wrapper ends.

In the conventional bread wrapping machine, loaves of bread 16 are delivered continuously in seriatim by a suitable conveyor (not shown), which operates at substantially right-angles to the plane of the drawing, to a delivery platform 17. A pusher 18, which operates in timed relationship with a main cam shaft 19 of the machine, is disposed adjacent platform 17 and functions to move the loaf 16 in the direction of the arrow 20.

An end portion of the web 2, shown in broken lines at 21, is draped over a roller 22 carried by platform 7, the draped portion 21 disposes itself, as will be hereinafter more fully described, in the path of travel of the loaf 16 when it is acted upon by the pusher 18.

A lifter table 23 is pivoted at one end, as at 24, said table being swingable downwardly from the position shown in the drawing into planar alignment with platform 17. Hence, when pusher 18 moves the loaf 16 upon table 17, said loaf is moved to the lifter table and, in being so moved, partially enshrouds itself with the end portion 21 of web 2. The lifter table then moves to the position illustrated in the drawing, drawing the web 2 over platform 7. Spaced bars 25, are also pivoted at 24, being spaced at their opposite ends by a lap roller 26, the bars 25 straddling the lifter table 23.

The arrangement is such that bars 25 move downwardly as the lifter table moves upwardly to the position shown in the drawing and in doing so, the lap roller 26 engages the web causing the web to wrap about a portion of the loaf and further moving the web over platform 7. The lifter table and bars 25 move in timed relationship with each other and with the other elements of the machine being also associated with main cam shaft 19 by suitable conventional means (not shown).

A shear blade 27 is mounted upon a shear block 28 which is pivoted at 29 for swingable movement. A shear plate 30 is carried upon the lower portion of the lifter table 23 and cooperates with shear blade 27 in performing a severing action upon web 2 when the shear block is rocked about its pivot. The shear block 28 is biased by coil spring 31 for movement in a clockwise direction, as viewed in the drawing, and a link 32 is pivotally connected to the shear block whereby said block may be rocked in a counterclockwise direction against the tension of spring 31 when the severing operation is performed.

As has been hereinbefore described, the present invention is particularly directed to the cutting or severing of a web of wrapping material into individual wrappers in timed relationship with the feeding of the objects to be wrapped. To accomplish this operation, a solenoid 33 having a plunger 34 is positioned adjacent the lifter table 23, the plunger being pivotally connected to a link 35 which, in turn, is pivotally connected to link 32. The solenoid is electrically connected to control box 9 by conductors 36, interposed in one of which is a series switch 37.

The arrangement is such that when an opaque dot 8 carried by web 2 intercepts the light from light source 11 to photoelectric cell 13, a signal is sent to the control box which is relayed by conventional means (not shown) to solenoid 33, provided that switch 37 is closed, to actuate the solenoid. The actuation of the solenoid causes movement of link 32 to move block 28 counterclockwise and effect the severing of the web 2. Hence, under normal conditions, that is, when switch 37 is closed, each time a dot 8 passes the aperture 15, the web is severed into an individual wrapper.

A cam 38 is mounted upon cam shaft 19 and through-

3

out an angle of about 40° its periphery has a reduced radius of curvature, as indicated at 39. An actuating arm 40 is pivotally mounted, as at 41, to the housing of switch 37 and at the opposite end, the arm 40 carries a follower roller 42 which rides upon the periphery of cam 38. Switch 37 is of the normally closed type and comprises a resiliently biased control pin 43 which bears upon arm 40 and causes roller 42 to bear upon the periphery of cam 38.

The arrangement is such that during the major portion of a revolution of cam shaft 19 the switch 37 is held by arm 40 in open position, but when roller 42 encounters the indented portion 39 of the cam periphery, the spring-pressed pin protrudes outwardly and the switch 37 returns to its normally closed position. At this phase solenoid 33 is placed in circuit with the control box 9 and when the signal dot 8 passes the light source-photoelectric cell assembly, the solenoid will be actuated. However, it can be seen that if the dot 8 passes the light source-photoelectric assembly when the follower roller 42 is riding on the portion of the cam periphery of large radius of curvature, the solenoid will not be actuated since switch 37 will be open.

The cam 38 is also provided, in its face, with a cam groove 44 defined by an inner wall 45 and an outer wall 46. Throughout a major portion of a revolution of cam 38, the walls 45 and 46 are substantially circular and concentric. However, for an angle of about 40° the outer wall extends radially outwardly, as shown at 47 and in substantial alignment with the initial 40° radial line 48, considered in the direction of rotation of the cam, the inner wall 45 bulges outwardly, as shown at 49.

It will be noted that the angular span of the depressed portion 39 is substantially diametrically opposite the angular span of the portion 47 and that the bulge 49 is disposed 180° away from the trailing end of the depressed portion 39, considered in the direction of rotation of the cam. The purpose of this arrangement will be hereinafter more fully described.

A lever 50 is pivoted at one end, as at 51, to a portion of the machine frame. The opposite end of lever 50 is pivotally connected, as at 52, to the pivotal juncture of links 32 and 35. A cam follower roller 53 is mounted intermediate the length of lever 50 and bears upon the inner wall 45 of the cam groove 44 under the influence of spring 31.

Thus, link 32 may be moved to actuate cutter block 28 by two means, solenoid 33 or lever 50 when cam roller 53 engages the bulge 49. It will be noted that the cutter blade 27 can only be actuated when the cam roller 53 rides upon that portion of the inner wall spanned by the radial lines 48 and 54 since the outer wall only recedes radially outwardly at the aforesaid span. In addition, the solenoid 33 can only function to move the cutter blade during this angular span since said span also controls the period of close of switch 37.

In the operation of the device, the device is initially set for a predetermined average girth of the article to be wrapped, for instance, for a loaf of bread of average girth. Of course, it is substantially impossible to control absolutely the girth of each succeeding loaf of bread fed to the machine and variations are bound to occur. However, the solenoid 33 without being restrained by cam 38 can accommodate these changes in girth through an angle of about 40° which represents, within said 40° tolerance a predetermined variation of overlap of the wrappers upon the bread. However, it may so happen that a loaf of unusually small girth may be fed to the machine. In view of the fact that the initial wrap of the bread determines the extent that the web 2 is drawn over table 7, it may so happen that the web is drawn to position a signal dot 8 just short of the aperture 15. Hence, for this loaf of bread no signal will be sent to the control box 9 and solenoid 33 will not be caused to operate. However, when the end of the actuating 40°

4

angle of the cam 38 is reached and no signal has been sent by the control box, the bulge 49 engages the follower roller 53 and the cutter knife 27 is actuated. The actuation of the cutter knife in this instance is purely mechanical as opposed to its actuation by the solenoid 33.

At this phase of the operation, the web 2 is so left on the table 7 that when pusher 18 next operates, a dot 8 will immediately pass the aperture. A cutting signal will then be sent to box 9, but at this period of operation, roller 42 is no longer on the depressed portion 39 of the cam periphery and, hence, switch 37 will be open. Accordingly, the cutting signal will not be transmitted to solenoid 33 and the cutter will remain inactive until the next signal dot 8 is reached, if this occurs during the actuating 40° angle span of the cam. If no signal is sent to the solenoid during the actuating 40° angle, the bulge 49 will again operate the cutter.

Of course, in normal operation, inasmuch as the average girth of the loaves may be controlled, an unusually small loaf will be followed by a larger loaf and the function of the cutting operation will then return to the solenoid 33.

The machine also compensates for unusually large loaves, in which case, two signal dots may be pulled past the aperture 15 by one loaf. In this case, the closing period of switch 37 will not be reached when the second signal is given and solenoid 33 will not be energized. However, the bulge 49 will again perform the cutting operation.

If a series of unusually small or unusually large loaves of bread are encountered, it means that the average size loaf is misconceived and wrappers having smaller or greater spacing between dots 8 should be used.

It is to be understood, of course, that the actuating angle of 40° is not critical per se and said angle may be larger or smaller, as desired. However, for the wrapping of bread an angle of about 40° is preferred.

Other unpatentable modifications which do not depart from the essence of the invention may be made by those skilled in the art and, hence, it is not intended that the invention be limited to the exact details shown and described except as necessitated by the appended claims.

I claim as my invention:

1. A wrapper cutting device which comprises, means for supporting a forwardly moving web of wrapper material having a plurality of substantially opaque signal dots spaced lengthwise upon said web, electric signal-producing means disposed adjacent said support to produce an electric signal when a dot passes adjacent said signal-producing means, means for draping an end portion of said web around an article to be wrapped, means for moving said article laterally to envelope the article with the web and move the web over said support a distance substantially proportional to the lateral girth of said article, a cutter for cutting the web between the web support and said moved article, electrical means for actuating said cutter, connecting means between said electrical means and signal-producing means for actuating said electrical means in response to said signal, a cam movable in timed relationship to the movement of said article-moving means, electric switch means connected in said connecting means for connecting and disconnecting said electrical actuating means and said signal-producing means, a cam follower controlled by said cam for closing said switch means for a predetermined angular movement of said cam, a second cam movable in timed relationship to said first-mentioned cam, a second follower means controlled by said second cam, means connecting said second follower means to said cutter to actuate said cutter at substantially the period at which the switch means opens.

2. A wrapper cutting device which comprises, means for supporting a forwardly fed web of wrapper material having a plurality of substantially opaque signal dots

5

spaced lengthwise upon said web, a light source-photoelectric cell assembly disposed adjacent said support to produce an electric signal when a dot carried by said web passes between said light source and photoelectric cell, means for draping an end portion of said web around an article to be wrapped, means for moving said article laterally to envelope the article with the web and move the web over said support a distance proportional to the lateral girth of said article, a cutter for cutting the web between the web support and said moved article, electrical means for actuating said cutter in response to said signal, a cam movable in timed relationship to the movement of said article-moving means, electric switch means controlling the connection between said electrical actuating means and said light source-photoelectric cell assembly, a cam follower controlled by said cam for closing said switch means for a predetermined angular movement of said cam and opening it for the remainder of the angular movement of the cam, a second cam movable in timed relationship to said first-mentioned cam, a second follower means controlled by said second cam, means connecting said second follower means to said cutter to actuate said cutter at substantially the period at which the switch means opens.

3. A wrapper cutting device which comprises means for supporting a forwardly moving web of wrapper material having a plurality of signal dots spaced lengthwise upon said web, electric signal-producing means disposed adjacent said support to produce an electric signal when a dot passes adjacent said signal-producing means, means for moving the article to be wrapped into contact with an end portion of said web laterally to envelope the article with the web and move the web over said support a distance substantially proportional to the girth of said article, a cutter for cutting the web between the support and said moved article, electrical means connected to said signal-producing means for actuating said cutter in response to said signal, a cam movable in timed relationship to the movement of said article-moving means, normally closed electric switch means connected between said signal-producing means and actuating means for connecting and disconnecting said electrical actuating means from said signal-producing means, a cam follower controlled by said cam for permitting said switch to close only for a predetermined angular movement of said cam, a second cam movable in timed relationship to said first-mentioned cam, a second follower means controlled by said second cam, means connecting said second follower means to said cutter to actuate said cutter at substantially the period at which the switch means opens after its period of close.

4. In a machine for wrapping sequentially fed articles of varying girths wherein the wrapping of the article draws a web of wrapping material of a length proportional to the girth of the article from a support of said web material, and wherein said web material carries longitudinally spaced signal triggering dots, the combination with said machine of a web cutting device for severing the web into individual wrappers for said articles, said web cutting device comprising, a cutting knife, a signal-producing means disposed adjacent said web for transmitting an electrical signal in response to the passage of a signal triggering dot, electrical means connected to said signal transmitting device for actuating said cutting knife in response to a received signal, an electric switch connected between said signal transmitting device and said electrical cutting knife actuating means, a cam movable in timed relationship to the passage of said web to open and close said switch, a cam follower controlled by said cam opening said switch for only a predetermined angular travel of said cam, a second cam movable in timed relationship with said first-mentioned cam, second cam follower means controlled by said second cam for actuating said cutting knife at substantially the time when said switch means is opened.

6

5. In a machine for wrapping sequentially fed articles of varying girths wherein the wrapping of the article draws a web of wrapping material of a length proportional to the girth of the article from a supply of said web material, and wherein said web material carries longitudinally spaced signal triggering dots, the combination with said machine of a web cutting device for severing the web into individual wrappers for said articles, said web cutting device comprising, a cutting knife, a signal-producing means disposed adjacent said web for transmitting an electrical signal in response to the passage of a signal triggering dot, electrical means connected to said signal transmitting device for actuating said cutting knife in response to a received signal, a cam movable in timed relationship with the passage of said web, cam follower means controlled by said cam, means for connecting said cam follower means and said cutting knife for actuating said cutting knife at a predetermined phase of revolution of said cam, said cam follower being restrained from movement by said cam for a major portion of the revolution of the cam and being unrestrained by said cam for a minor portion of the revolution of the cam.

6. In a machine for wrapping sequentially fed articles of varying girths wherein the wrapping of the article draws a web of wrapping material of a length proportional to the girth of the article from a supply of said web material, and wherein said web material carries longitudinally spaced signal triggering dots, the combination with said machine of a web cutting device for severing the web into individual wrappers for said articles, said web cutting device comprising, a cutting knife, a signal-producing means disposed adjacent said web for transmitting an electrical signal in response to the passage of a signal triggering dot, electrical means connected to said signal transmitting device for actuating said cutting knife in response to a received signal, an electric switch connected between said signal transmitting device and said electrical cutting knife actuating means, a cam movable in timed relationship to the passage of said web, a cam follower controlled by said cam closing said switch for only a predetermined angular travel of said cam.

7. In a machine for wrapping sequentially fed articles of varying girths wherein the wrapping of the article draws a web of wrapping material of a length proportional to the girth of the article from a supply of said web material, and wherein said web material carries longitudinally spaced signal triggering dots, the combination with said machine of a web cutting device for severing the web into individual wrappers for said articles, said web cutting device comprising, a cutting knife, a signal-producing means disposed adjacent said web for transmitting an electrical signal in response to the passage of a signal triggering dot, electrical means connected to said signal transmitting device for actuating said cutting knife in response to a received signal, a normally closed electric switch connected between said signal transmitting device and said electrical cutting knife actuating means, a cam movable in timed relationship to the passage of said web, a cam follower controlled by said cam opening said switch for only a predetermined angular travel of said cam, a second cam movable in timed relationship with said first-mentioned cam, second cam follower means controlled by said second cam, means for connecting said second cam follower means to said cutting knife for actuating said cutting knife at the beginning of said predetermined travel of the first-mentioned cam, said second cam follower means being restrained from movement by said second cam throughout said predetermined angular travel of said first cam and being unrestrained by said second cam during the remaining angular travel of said first cam.