June 29, 1965 J. J. AMIC, SR 3,191,804

FOIL PLATE DISPENSING MECHANISM

Filed April 24, 1963 3 Sheets-Sheet 1

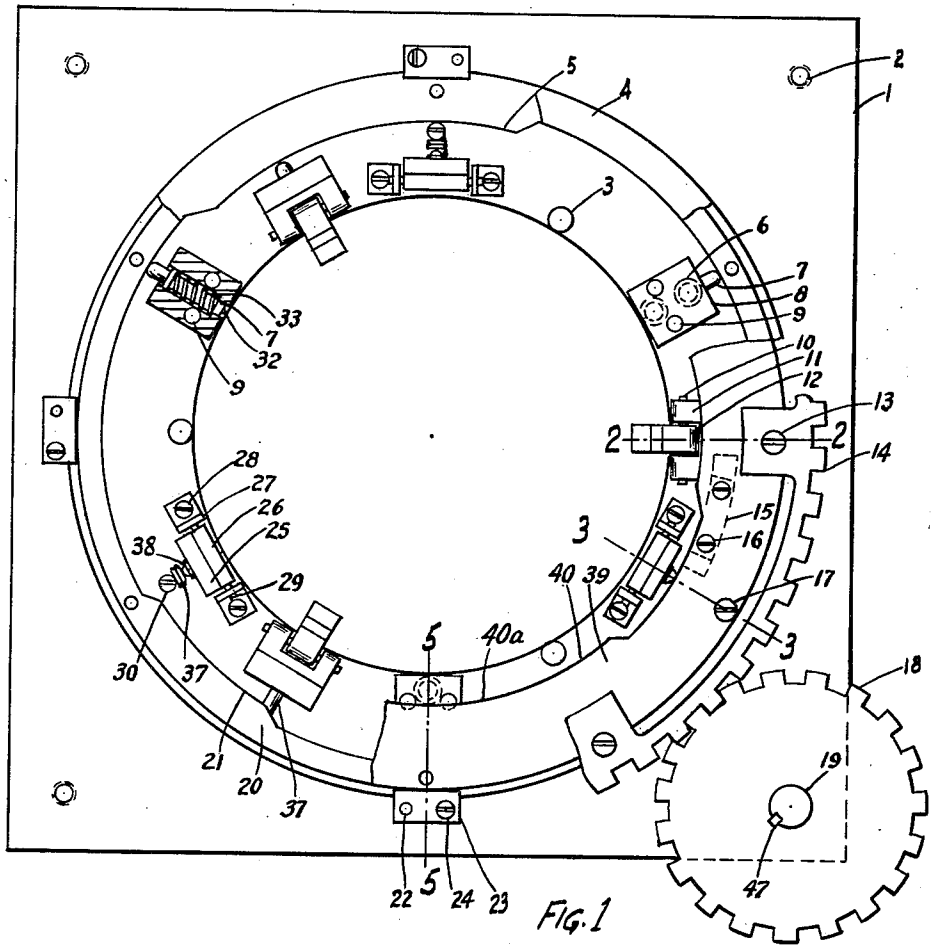


FIG. 1

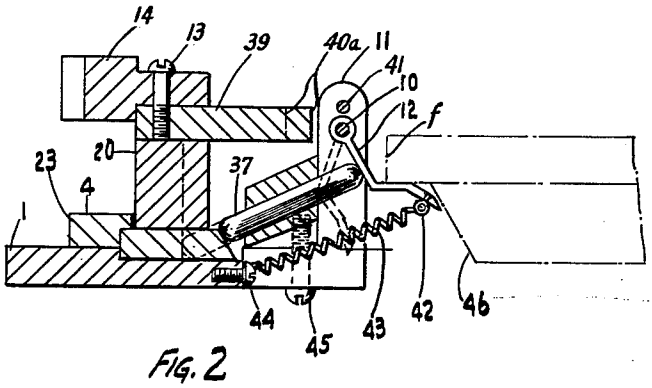


FIG. 2

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FOIL PLATE DISPENSING MECHANISM

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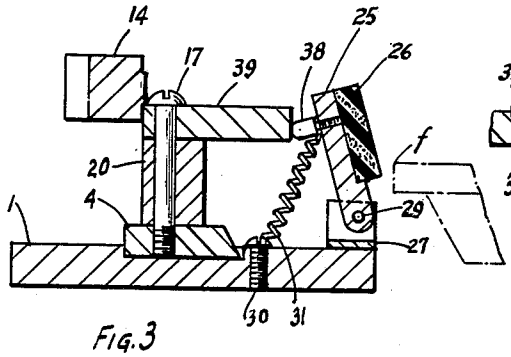


FIG. 3

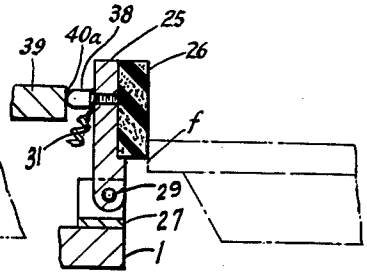


FIG. 4

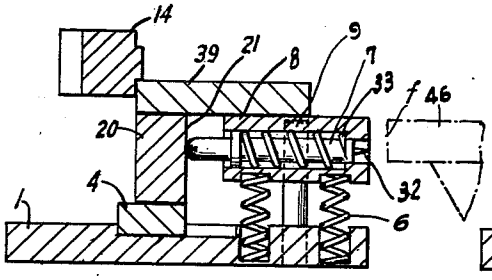


FIG. 5

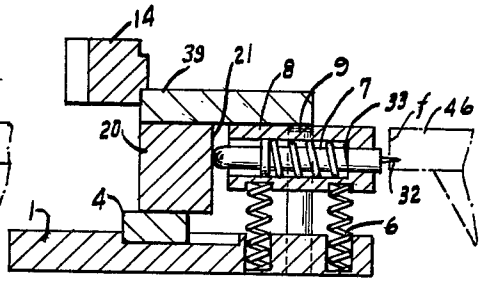


FIG. 6

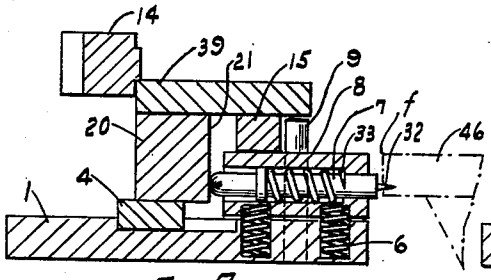


FIG. 7

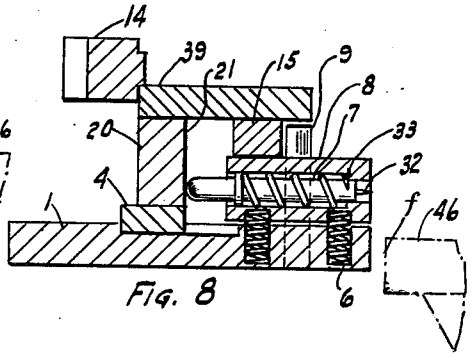


FIG. 8

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FOIL PLATE DISPENSING MECHANISM

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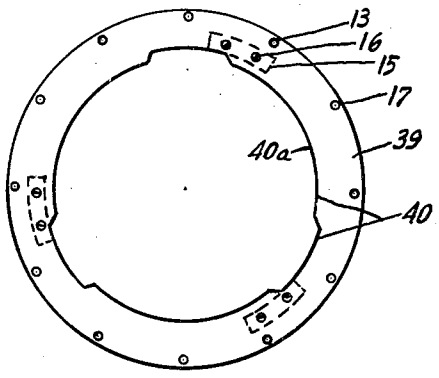


FIG. 9

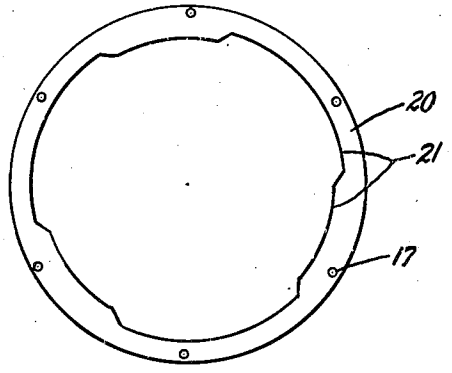


FIG. 10

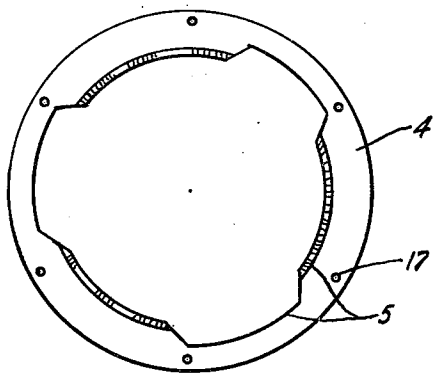


FIG. 11

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United States Patent Office 3,191,804 Patented June 29, 1965

3,191,804

FOIL PLATE DISPENSING MECHANISM

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Filed Apr. 24, 1963, Ser. No. 275,264
2 Claims. (Cl. 221—213)

This invention relates to a mechanism for delivering, one at a time, from a magazine or holder in which they are stacked or nested, foil containers, as for example aluminum foil plates or pans of round, rectangular, or irregular shape. More particularly, this invention relates to a mechanism for delivering foil plates which are characterized by a laterally directed flange in parallel relation with the bottom of said plate and with a vertical flange at the outermost periphery of said lateral flange. It should be understood that said vertical flange may have a raw edge or may contain a bead, commonly called an interrupted bead flange, or it may be bent over at the edge to form the commonly called inverted V flange.

In the frozen food and baking industries, the use of foil plates has all but superseded the use of metal pans or cardboard containers for preparing pies or other frozen food items, since the transfer of food from one container to another is eliminated. Normally, the foil plates contain a curled bead flange and are fed onto a conveyor automatically with a dispenser and are subsequently filled with food. Accordingly, the nesting and dispensing characteristics of the plates assume a considerable amount of importance. Unfortunately, the design and manufacturing tolerances are such that plates having a vertical flange do not nest perfectly so that it has been necessary to manually feed this type of plate onto the conveyor. Attempts to mechanize this procedure have not been satisfactory due partially to the fact that the vertical flange of the foil plate is relatively fragile, but primarily to the fact that such plates do not nest perfectly to form a neat stack. Accordingly, the plates tend to catch on the vertical flange of an adjacent plate so that the bases of successive plates are not parallel to each other but lie at varying angles to one another. Consequently, a magazine dispenser has not been developed for this type plate.

It is an object of this invention, therefore, to produce a mechanism wherein the plates may be released one at a time in timed relationship from the bottom of a stack.

It is a further object of this invention to provide a method and means whereby a plate which is not in perfect horizontal position may be positioned properly for automatic dispensing.

Another object of this invention is to provide a method and means whereby this type of foil plate may be automatically dispensed one at a time in timed relationship with the movement of the conveyor.

Other objects will occur to those skilled in the art from the detailed description of the drawings which follows.

Basically, my invention consists of three cam rings and an interrupted cam member attached thereto which are rotatably driven in synchronism with one with another and with the conveyor. Each of the cam rings contains equally spaced cam surfaces consisting of equally spaced indentations and projections which perform each function in timed relationship. The device includes further a series of lifting mechanisms, a series of holding fingers and a series of impaling needles, each of which are actuated by its respective cam surface. The principle of operation is as follows. The lifting member first engages the side wall, bottom or lateral flange of the plate and positions it in level horizontal position. Thereafter, the holding fingers are actuated by their respective cams to engage with the vertical flange of the plate to hold it in slidably releasable frictional engagement. Thereafter, the impaling needle members are extended through the action of

their respective cams and impale the vertical flange of the plate. The lifting member then drops out of position through spring action. The fourth cam action is adapted to force the impaling needle assembly downward with the plate impaled on the needles. The impaling needle members are then retracted, thus allowing the plate to fall onto the conveyor. The holding fingers retract out of engagement position and the entire stack of plates drops into horizontal position on the lifting members. The entire apparatus is driven by a large gear which is synchronized with the movement of the conveyor in such a manner that one plate must be dispensed per predetermined distance of movement of the conveyor depending upon the size of the containers to be dispensed and the linear movement of an equally spaced conveyor matrix.

Referring now to the drawings, FIG. 1 is a plan view of the dispensing mechanism of my invention.

FIG. 2 is a sectional view taken along lines 2—2 of FIG. 1 and illustrating the lifting mechanism.

FIG. 3 is a sectional view taken along lines 3—3 of FIG. 1 which illustrates the finger retaining mechanism in non-engaging position.

FIG. 4 is a sectional view taken along lines 3—3 of FIG. 1 which illustrates the finger retaining mechanism in engaging position.

FIG. 5 is a sectional view taken along lines 5—5 of FIG. 1 which illustrates the needle in retracted position.

FIG. 6 is a sectional view taken along lines 5—5 of FIG. 1 which illustrates the impaling needle in extended position.

FIG. 7 is a sectional view taken along lines 5—5 of FIG. 1 which illustrates the needle assembly in lowered position with the impaling needle extended.

FIG. 8 is a sectional view taken along lines 5—5 with the needle assembly in lowered position and the impaling needle retracted.

FIG. 9 is a plan view of the finger cam ring illustrating the annular cam profile. The vertical needle cam assembly is illustrated in dots.

FIG. 10 is a plan view of the needle cam ring illustrating the cam profile of equally spaced projections and indentations.

FIG. 11 is a plan view of the lift cam ring illustrating its cam profile of equally spaced indentations and projections.

Referring now in detail to the drawings, the four cams are illustrated as follows: The lifter cam ring is illustrated by numeral 4, the needle cam ring is illustrated by numeral 20, the vertical driving cam which acts to lower the entire needle assembly is illustrated by numeral 15, and the finger cam ring is illustrated by numeral 39.

In the drawings, the entire assembly is mounted on base plate 1 which is secured to the conveyor (not shown) by use of mounting tap holes 2. In the modification illustrated the plates are stacked in vertical magazine bars 3 equidistantly located around the assembly. The lifter cam ring 4 contains lifter cam ring face 5 or profile. The entire assembly is driven by means of a large bull gear 14 held in position by bull gear hold down screws 13. The teeth of the bull gear 14 mesh with the teeth of a pinion gear 18 which is keyed by key 47 onto the driving shaft 19 which is connected to the conveyor driving mechanism not shown.

Referring now to the lifting mechanism which is best illustrated in FIG. 2, this mechanism consists of the lifting member 12 which pivots on pivot shaft 10 located in lifter housing 11. Safety pin 41 is provided to prevent lifting member 12 from exceeding a predetermined arc. In case of malfunction, such as, for example, breakage of spring 43, pin 41 engages with lifter member 12 to prevent it from becoming caught in the cam face of

cam ring 39. The lifter is normally held in non-engageable position (as shown in dotted lines) by means of spring 43 attached to the end of the lifter by an eye bolt 42 and at its base by screw 44. The lifter housing is connected to the base plate 1 by screw 45. As the various cam rings are rotated the lifter projection of cam profile 5 of ring 4 engages with the plunger pin 37 to extend same and therefore push lifter 12 into engagement position as is shown in full lines of FIG. 2. This places the plate 46 in proper horizontal position for the subsequent steps in the dispensing operation.

The finger retaining members are best illustrated in FIGS. 3 and 4 and consist of finger housing 27, secured to base plate 1 by screws 28, finger pivot shaft 29, and the body of the finger 25. Each of the fingers contains a resilient retaining pad 26 made of sponge rubber or like material. The finger is held in non-engagement position by means of spring 31 secured to the base plate 1 by screw 30 and to the upper end of the body of the finger by a bolt to which the cam follower 38 is attached. The finger cam ring 39 is secured to the needle cam ring 20 and to the lifter cam ring 4 by means of cam assembly screw 17. The entire cam ring assembly, including cam rings 4, 20, 39 and bull gear 14, is secured by retainer blocks 23, screws 24 and dowels 22 onto base plate 1. As the finger cam ring 39 is rotated, the projection 40*a* of cam face 40 comes into engagement with cam follower 38 and thus pushes the body of the finger inwardly as is best shown in FIG. 4. In this position, the resilient finger pads 26 engage with the upper surface of the vertical flange *f* of the stack of plates 46.

The needle assembly consists of the impaling needle 32 held by a spring 33 inside of the needle holder 7 which, in turn, is enclosed by a retainer block 8. The needle block 8 is urged upwardly by vertical springs 6 along needle block guide pins 9. In FIG. 5 the needle is shown in retracted position with the needle holder engaged against the indented surface of needle cam profile 2. In FIG. 6 the needle cam ring has rotated so as to bring the projection of cam face 21 into engagement with the terminal end of the needle holder 7 forcing it inward to cause the impaling needle to impale the vertical flange of plate 46. In FIG. 7 the needle block 8 has been forced downwardly by the action of vertical driving cam 15 (secured to finger cam ring 39 by screws 16) with the needle still extended due to the action of cam face 21. This action pulls the bottom plate downwardly out of frictional engagement with the holding pads 26 and thus as the cam ring turns so that the indented portion of cam face 21 allows needle holder 7 to retract due to the tension of spring 32 thus retracting the impaling needle out of engagement with plate 46 and dropping it onto the conveyor.

The action of the mechanism then is to first lift the plate horizontally, to then grip the upper portion of the vertical flange *f* of the stack of pans with the resilient sponge rubber pads of the retaining fingers, to then impale the vertical flange *f* with the needles, to drop the lifter mechanism, and force the plate downwardly out of engagement with the pads of the holding fingers and then retract the needles to drop the plate onto the conveyor. The needle assembly is raised to its starting position with the impaling needles still retracted and simultaneously therewith the lifters are brought back into its leveling and supporting position. The side fingers retract and the entire stack falls onto the lifters thereby placing the bottom pan in a horizontally level position. This is accomplished by the action of the various cam profiles of the cam rings of the mechanism which are driven in a manner synchronous with the movement of the conveyor. In the modification shown, I have utilized cam faces having three equally spaced projections and three equally spaced indentations on each cam ring equidistantly placed. This is adapted for round containers.

With square containers, it would be necessary to use a cam face on each cam ring having four equally spaced projections and four corresponding indentations in the ring.

Various modifications will occur to those skilled in the art without departing from the spirit or scope of this invention as defined in the appended claims.

I claim:

1. A device for dispensing container members in one by one fashion from the bottom of a stack wherein each container member has a vertically disposed flange at its outer periphery and wherein the bases of the individual container members in the stack are not in horizontally parallel relation with each other, which comprises:

(a) a frame containing a magazine having a dispensing opening below the bottom of an operatively positioned stack;

(b) means for holding an operatively positioned stack, including

(i) an annular series of horizontally spaced bottom lifters mounted on the frame for movement between an upper and medial position in which they position the bottom container member to a level horizontal position and support the stack through their engagement with the exterior surface of the bottom container member of the stack and a lower and lateral position in which they are located outside of the downward path of the bottom container member of the stack, and

(ii) an annular series of horizontally spaced side members having resilient inner surfaces and mounted on the frame for movement between an inward position in which they support the stack through slidably releasable frictional engagement with the vertical flange of the container members located at the lower portion of the stack and an outer position in which they release the stack;

(c) means for removing the bottom container member from the bottom of the stack, including

(i) an annular series of horizontally spaced impaling needles mounted on the frame for movement from a retracted starting position inwardly to impale the vertical flange of the bottom container member of the stack, thence downwardly to pull the container member downwardly out of frictional engagement with the side members, thence outwardly to release the bottom container member and thence upwardly back to their starting positions; and

(d) operating means for moving said stack holding means and said container member removing means in predetermined timed relation with each other to remove a container member while the side members engage the stack and the bottom lifters are in a lower and lateral position out of the way of such removal and after each removal to drop the stack upon the bottom lifters in their upper and medial position while the stack is disengaged by the side members and the impaling needles, said operating means including

(i) a cam ring assembly and a driving means operatively connected thereto so as to drive said cam ring assembly in timed relation

(a) said cam ring assembly comprising three cam rings, each containing an annular cam profile containing equally spaced horizontal projections and indentations and a series of equally spaced vertical cam members;

(b) said projections of said cam profiles being operative to move said bottom lifters, said side members and said impaling needles inwardly in timed sequence and said inden-

tations of said cam profiles being operative to move said bottom lifters and side members to an outer position and said impaling needles to a retracted position;

(c) said vertical cam members being operative to move said impaling needles from an upward position downwardly to a lower position and thence upwardly to the original starting position.

2. The dispensing device of claim 1 in which said driving means comprises a large annular gear surrounding

said cam ring assembly in combination with a pinion gear keyed to a driven shaft.

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