

SPECIFICATION

Improvements in and relating to food press or extruder

5 This invention relates to a food press or extruder device.

It is often required to extrude a length of food mixture, usually in the form of an uncooked product, so as to give a decorative effect. One example of such an extruder or press is an icing bag from which icing is extruded through a shaped nozzle by applying pressure to the bag. Another instance where extrusion, if required, is in respect of pasty mixtures for conversion into biscuits or the like and in this case it is usually necessary to apply high extrusion forces since the paste to be extruded is usually quite thick and stiff. An icing bag or the like is therefore not usually suitable and extruders are used consisting of a barrel containing the paste and a piston which is forced along the barrel to extrude the pasty mixture through a shaped outlet from the barrel.

For convenient use, such an extruder should desirably be operated by one hand and in addition it is desirable that the operating mechanism advance the piston with a relatively large extrusion force and without too much effort from the user. Accordingly, it is an object of this invention to provide such an extruder.

According to the invention there is provided an extruder device for pasty or semi-liquid food mixtures comprising a barrel along which a piston can be forced to extrude food mixtures placed in the barrel through an outlet from the barrel, a pistol grip one part of which is stationary relative to the barrel and another part of which includes a lever pivoted intermediate its ends to the stationary part, the outer end of the lever being pivotable against the action of a spring for advancing the piston along the barrel when the pistol grip is squeezed by the user, a pawl pivotably attached to the other end of the lever and being resiliently urged towards a piston rod attached to the piston, teeth on the piston rod engaged by the pawl when the pistol grip is squeezed and the lever pivoted to advance the piston rod, the pawl returning over the teeth when the lever pivots back toward the relaxed position of the pistol grip, and the pawl being pivoted out of engagement with the teeth on the piston rod as the pistol grip approaches its relaxed position and being held out of engagement with the teeth in the relaxed position by the force of the said spring, and an abutment which is resiliently displaced by the teeth to allow advance of the piston rod but which engages and blocks the teeth to prevent return of the piston rod, the abutment being manually disengageable from the teeth to allow return of the piston along the barrel.

Such a device is simple to operate and the advancing mechanism for the device can be used with one hand so leaving the other hand of the user entirely free or free to guide the barrel so as to direct the extruded contents of the barrel accurately. The operating mechanism also has the

65 advantage of being relatively simple to construct.

The abutment is provided to prevent return of the piston rod during periods when the pistol grip is released since some food mixtures may be somewhat compressible. This abutment can be provided on a plate which is slidably mounted relative to the barrel in a direction transverse to the axis of the piston rod. The plate can have a hole through which the piston rod extends, one edge of that hole constituting the abutment. When the piston needs to be retracted to allow fresh food mixture to be inserted into the barrel, this plate can be manually displaced against a spring to disengage the abutment from the teeth.

The pawl must also be disengaged from the teeth at this time. According to a preferred embodiment of the invention, the pawl abuts the stationary said one part as the lever approaches the relaxed position of the pistol grip, that abutment of the pawl against the said one part pivoting the pawl out of engagement with the teeth of the piston rod in the relaxed position of the pistol grip.

An extruder device according to the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a sectional elevation of the device; Figures 2 and 3 are sectional elevational details illustrating the operation of the advancing mechanism;

Figure 4 is a sectional detail taken on the line 4—4 of Figure 3; and

Figure 5 is an exploded perspective detail.

The extruder device 10 shown in the drawing includes a hollow barrel 12. At its lower end, the barrel has an external screw thread and joined by this screw-thread to the lower end of the barrel is an annular ring 14. This ring has an inwardly directed circular flange 14a which retains an outlet plate or nozzle 15 over the open lower end of the barrel. Through the outlet plate or nozzle, pasty food mixtures contained in the barrel can be extruded and the ring 14 can be removed to clean the barrel and/or replace the outlet plate or nozzle 15 by one of a different shape or size.

The upper end of the barrel is closed by means of a cap 16 which is joined by means of a screw-thread 18 to the barrel so that the barrel can be removed for cleaning. Slidably mounted within this cap 16 is a piston rod 20, the rod extending through a central hole 21 in the portion of the cap joined to the barrel and out through the top of the cap through an upper hole 22. The lower end of this piston rod is attached to a piston 23 which is a close sliding fit within the barrel whilst at its upper end the piston rod is provided with a cap 24.

The cap 16 serves the function of closing the upper end of the barrel 12 and in addition it is shaped in the form of a pistol-grip which includes a stationary portion 26 and a pivotally mounted lever 28. The latter lever is pivoted around a pivot point 30 to the stationary portion 26 at a position intermediate its ends. The lever is urged to the

open position of the grip shown in Figure 1 by means of a spring 32. The lever can however be pivoted about the pivot 30 when the user squeezes the pistol grip to the positions shown in Figures 2 and 3.

Pivotally joined to the lever 28 adjacent its innermost end is pawl 34. This pawl is urged in a clockwise direction as viewed in Figure 1 towards the piston rod 20 by a spring 36.

The piston rod 20 is, as best shown in Figure 5, of U-shaped cross-section and has been made by folding a flat piece of metal such as stainless steel. The free ends of the arms of the U-shaped section are provided with teeth or serrations 38 facing the lever 28 and pawl 34. The teeth or serrations are of Z shape as viewed in Figure 1. Thus, each tooth has a portion 38a which is transverse to the length of the piston rod and an inclined cam portion 38b.

The pawl 34, as best shown in Figure 5, has sides 34a which are pivotally attached to the lever 28, those sides being joined by a cross member 34b which has an edge 34c which is urged into resilient engagement with these teeth, and in particular the portions 38a by the spring 36. Thus, when the pistol grip is squeezed and the lever 28 pivoted in an anti-clockwise direction as viewed in the drawings, the edge 34c initially engages a portion 38a of one of the teeth of the piston rod 20 in the position shown in Figure 2, and continued squeezing of the lever 28 to the position shown in Figure 3 then advances the piston rod in a downward direction along the barrel so causing the piston 22 to extrude some of the food mixture contained in the barrel. When the pistol grip is released and the lever 28 allowed to pivot back to its original position as shown in Figure 1 under the effect of the spring 32, the edge 34c of the pawl resiliently slides over the portions 38b of the teeth 38 on the piston and so does not cause the piston rod to withdraw upwardly.

A non-return control plate 40 is mounted in the cap 16 and is slidable in a direction transverse to the axis of the piston rod 20. The latter is urged towards the left as viewed in the drawing by means of a spring 42 and in the plate 40 is an opening 40a through which the piston rod 20 extends. This opening has an edge 44 which is urged into resilient engagement with the teeth 38 on the piston rod by the spring 42. The shape of the teeth or serration 38 is such that, when the piston rod is moved in a downward or advancing direction by the pistol grip, the plate 40 is displaced resiliently against the effect of the spring 42 by the engagement of the cam portions 38b of the teeth and the edge 44 and so the piston rod allowed to advance. However, when the pistol grip is released, the engagement of a portion 38a of a tooth 38 with the edge 44 prevents the return of the piston rod and so the plate 40 therefore acts to prevent retraction of the piston rod.

Rotatably mounted between the sides 34a of the pawl about a pin 50 is a roller 52 (see Figure 5). In the relaxed position of the pistol grip

with the lever in the position shown in Figure 1, this roller 52 contacts the underside of the cap 16. The relative strengths of the springs 32 and 36 are such that the spring 32 causes the pawl to pivot in an anti-clockwise direction as viewed in the drawings against the effect of the spring 36 when the roller contacts the cap. In this way, when the pistol grip is relaxed, the edge 34c of the pawl is withdrawn from contact with the teeth 38.

At the completion of extrusion when fresh food mixtures need to be placed in the barrel, the piston 23 can be retracted by pressing a lip 56 of the plate 40 so as to move the plate against the effect of spring 42 so causing the edge 44 to release the teeth 38. Then the user can retract the piston and piston rod by pulling the cap 24. This retraction is not prevented by the engagement of the tip of the pawl 34 because, as noted above, in the relaxed position of the pistol grip, the edge 34c of the pawl has been withdrawn from engagement with the teeth. Once the piston has been withdrawn, fresh food mixtures can be inserted into the barrel after removal of the plate 15.

Near its upper end, the piston rod 20 has a portion 60 devoid of teeth. This is to prevent excessive advancement of the piston 23. Thus, once the piston approaches the lower end of the barrel 12 and the plate 15, the high mechanical advantage of the device could result in fracture of the plate 15 if the piston were forced against it. Instead, just before the piston can contact the plate, the pawl 34 will engage the last tooth 38 and thereafter it will slide along the portion 60 upon further movement of the lever 28 and so cease to advance the piston any further.

As can be appreciated the operating mechanism of the extruder device 10 is simple in construction, assembly and use and it can be actuated by the use of a single hand which leaves the other hand free to guide the extruder or for other uses. Also, the parts of the device in contact with food, e.g. the barrel 12, piston 23, can be moulded from synthetic plastics material and so are hygienic and can readily be kept clean, particularly since the barrel can readily be dismantled from the cap and the plate 15 for washing.

CLAIMS

1. An extruder device for pasty or semi-liquid food mixtures comprising a barrel along which a piston can be forced to extrude food mixtures placed in the barrel through an outlet from the barrel, a pistol grip one part of which is stationary relative the barrel and another part of which includes a lever pivoted intermediate its ends to the stationary part, the outer end of the lever being pivotable against the action of a spring for advancing the piston along the barrel when the pistol grip is squeezed by the user, a pawl pivotally attached to the other end of the lever and being resiliently urged towards a piston rod attached to the piston, teeth on the piston rod engaged by the pawl when the pistol grip is squeezed and the lever pivoted to advance the



open position of the grip shown in Figure 1 by means of a spring 32. The lever can however be pivoted about the pivot 30 when the user squeezes the pistol grip to the positions shown in Figures 2 and 3.

Pivotally joined to the lever 28 adjacent its innermost end is pawl 34. This pawl is urged in a clockwise direction as viewed in Figure 1 towards the piston rod 20 by a spring 36.

The piston rod 20 is, as best shown in Figure 5, of U-shaped cross-section and has been made by folding a flat piece of metal such as stainless steel. The free ends of the arms of the U-shaped section are provided with teeth or serrations 38 facing the lever 28 and pawl 34. The teeth or serrations are of Z shape as viewed in Figure 1. Thus, each tooth has a portion 38a which is transverse to the length of the piston rod and an inclined cam portion 38b.

The pawl 34, as best shown in Figure 5, has sides 34a which are pivotally attached to the lever 28, those sides being joined by a cross member 34b which has an edge 34c which is urged into resilient engagement with these teeth, and in particular the portions 38a by the spring 36. Thus, when the pistol grip is squeezed and the lever 28 pivoted in an anti-clockwise direction as viewed in the drawings, the edge 34c initially engages a portion 38a of one of the teeth of the piston rod 20 in the position shown in Figure 2, and continued squeezing of the lever 28 to the position shown in Figure 3 then advances the piston rod in a downward direction along the barrel so causing the piston 22 to extrude some of the food mixture contained in the barrel. When the pistol grip is released and the lever 28 allowed to pivot back to its original position as shown in Figure 1 under the effect of the spring 32, the edge 34c of the pawl resiliently slides over the portions 38b of the teeth 38 on the piston and so does not cause the piston rod to withdraw upwardly.

A non-return control plate 40 is mounted in the cap 16 and is slidable in a direction transverse to the axis of the piston rod 20. The latter is urged towards the left as viewed in the drawing by means of a spring 42 and in the plate 40 is an opening 40a through which the piston rod 20 extends. This opening has an edge 44 which is urged into resilient engagement with the teeth 38 on the piston rod by the spring 42. The shape of the teeth or serration 38 is such that, when the piston rod is moved in a downward or advancing direction by the pistol grip, the plate 40 is displaced resiliently against the effect of the spring 42 by the engagement of the cam portions 38b of the teeth and the edge 44 and so the piston rod allowed to advance. However, when the pistol grip is released, the engagement of a portion 38a of a tooth 38 with the edge 44 prevents the return of the piston rod and so the plate 40 therefore acts to prevent retraction of the piston rod.

Rotatably mounted between the sides 34a of the pawl about a pin 50 is a roller 52 (see Figure 5). In the relaxed position of the pistol grip

with the lever in the position shown in Figure 1, this roller 52 contacts the underside of the cap 16. The relative strengths of the springs 32 and 36 are such that the spring 32 causes the pawl to pivot in an anti-clockwise direction as viewed in the drawings against the effect of the spring 36 when the roller contacts the cap. In this way, when the pistol grip is relaxed, the edge 34c of the pawl is withdrawn from contact with the teeth 38.

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Near its upper end, the piston rod 20 has a portion 60 devoid of teeth. This is to prevent excessive advancement of the piston 23. Thus, once the piston approaches the lower end of the barrel 12 and the plate 15, the high mechanical advantage of the device could result in fracture of the plate 15 if the piston were forced against it. Instead, just before the piston can contact the plate, the pawl 34 will engage the last tooth 38 and thereafter it will slide along the portion 60 upon further movement of the lever 28 and so cease to advance the piston any further.

As can be appreciated the operating mechanism of the extruder device 10 is simple in construction, assembly and use and it can be actuated by the use of a single hand which leaves the other hand free to guide the extruder or for other uses. Also, the parts of the device in contact with food, e.g. the barrel 12, piston 23, can be moulded from synthetic plastics material and so are hygienic and can readily be kept clean, particularly since the barrel can readily be dismantled from the cap and the plate 15 for washing.

CLAIMS

1. An extruder device for pasty or semi-liquid food mixtures comprising a barrel along which a piston can be forced to extrude food mixtures placed in the barrel through an outlet from the barrel, a pistol grip one part of which is stationary relative the barrel and another part of which includes a lever pivoted intermediate its ends to the stationary part, the outer end of the lever being pivotable against the action of a spring for advancing the piston along the barrel when the pistol grip is squeezed by the user, a pawl pivotally attached to the other end of the lever and being resiliently urged towards a piston rod engaged by the pawl when the pistol grip is squeezed and the lever pivoted to advance the



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piston rod, the pawl returning over the teeth when the lever pivots back toward the relaxed position of the pistol grip, and the pawl being pivoted out of engagement with the teeth on the piston rod as the pistol grip approaches its relaxed position and being held out of engagement with the teeth in the relaxed position by the force of the said spring, and an abutment which is resiliently displaced by the teeth to allow advance of the piston rod but which engages and blocks the teeth to prevent return of the piston rod, the abutment being manually disengageable from the teeth to allow return of the piston along the barrel.

2. A device as claimed in Claim 1 in which the pawl abuts the stationary said one part as the lever approaches the relaxed position of the pistol grip, that abutment of the pawl against the said one part pivoting the pawl out of engagement with the teeth of the piston rod in the relaxed position of the pistol grip.

3. A device as claimed in Claim 2 in which the pawl includes a rotatable roller, the roller abutting the said one part when the lever approaches the relaxed position of the pistol grip.

4. A device as claimed in any preceding claim in which the piston rod has a portion devoid of teeth, that portion becoming aligned with the pawl when the piston reaches the end of the barrel so preventing further advance of the piston by the pawl.

5. A device as claimed in any preceding claim in which the abutment is provided on a plate which is slidably mounted relative the barrel in a direction transverse to the axis of the piston rod, the plate having a hole through which the piston rod extends, one edge of that hole constituting the abutment.

6. An extruder device for pasty or semi-liquid food mixtures comprising a barrel along which a piston can be forced to extrude food mixtures placed in the barrel through an outlet from the barrel, a cap removably joined to the barrel and closing one end thereof, the cap constituting the stationary part of a pistol grip another part of

which includes a lever pivoted intermediate its ends to the cap, the outer end of the lever being pivotable against the action of a spring for advancing the piston along the barrel when the pistol grip is squeezed by the user, a pawl pivotably attached to the other end of the lever and being resiliently urged by a further spring towards a piston rod attached to the piston, teeth on the piston rod engaged by the pawl when the pistol grip is squeezed and the lever pivoted to advance the piston rod, each tooth having one portion transverse to the longitudinal axis of the piston rod and another portion inclined to the longitudinal axis of the rod, the said one portion of a tooth being engaged by the pawl to advance the rod and the pawl returning over the said another portion of the teeth when the lever pivots back toward the relaxed position of the pistol grip, a rotatable roller mounted on the pawl, that roller abutting the cap and so pivoting the pawl out of engagement with the teeth on the piston rod as the pistol grip approaches its relaxed position and being held out of engagement with the teeth in the relaxed position by the force of said spring, a plate having a hole through which the piston rod extends, the plate being slidably and resiliently mounted in the cap, one edge of that hole resiliently engaging the teeth on the rod and being resiliently displaced by the said another portions of the teeth to allow advance of the piston rod but engaging the said one portion of a tooth to block the teeth and to prevent return of the piston rod, the plate being manually disengageable from the said one portion of a respective tooth to allow return of the piston along the barrel when required, and a portion on the piston rod devoid of teeth, that portion being aligned with the pawl when the piston reaches the end of the barrel so preventing further advance of the piston by the pawl.

7. An extruder device for pasty or semi-liquid food mixtures, substantially as herein described with reference to the accompanying drawings.