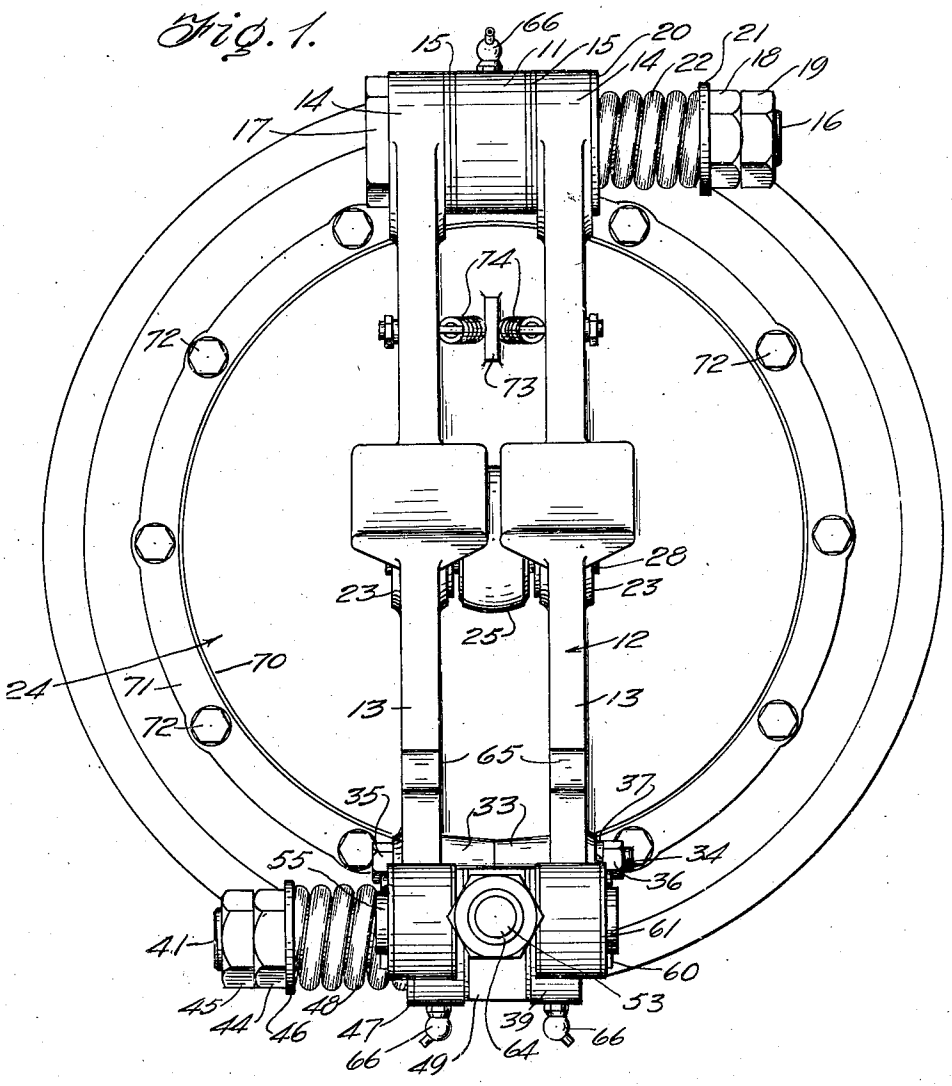
Aug. 6, 1940. T. R. JAMES 2,210,294

PUFFING GUN LID RELEASE MECHANISM

Filed July 15, 1938 3 Sheets-Sheet 1

Fig. 1.



Inventor

THOMAS R. JAMES,

By Robert E. Sadtler

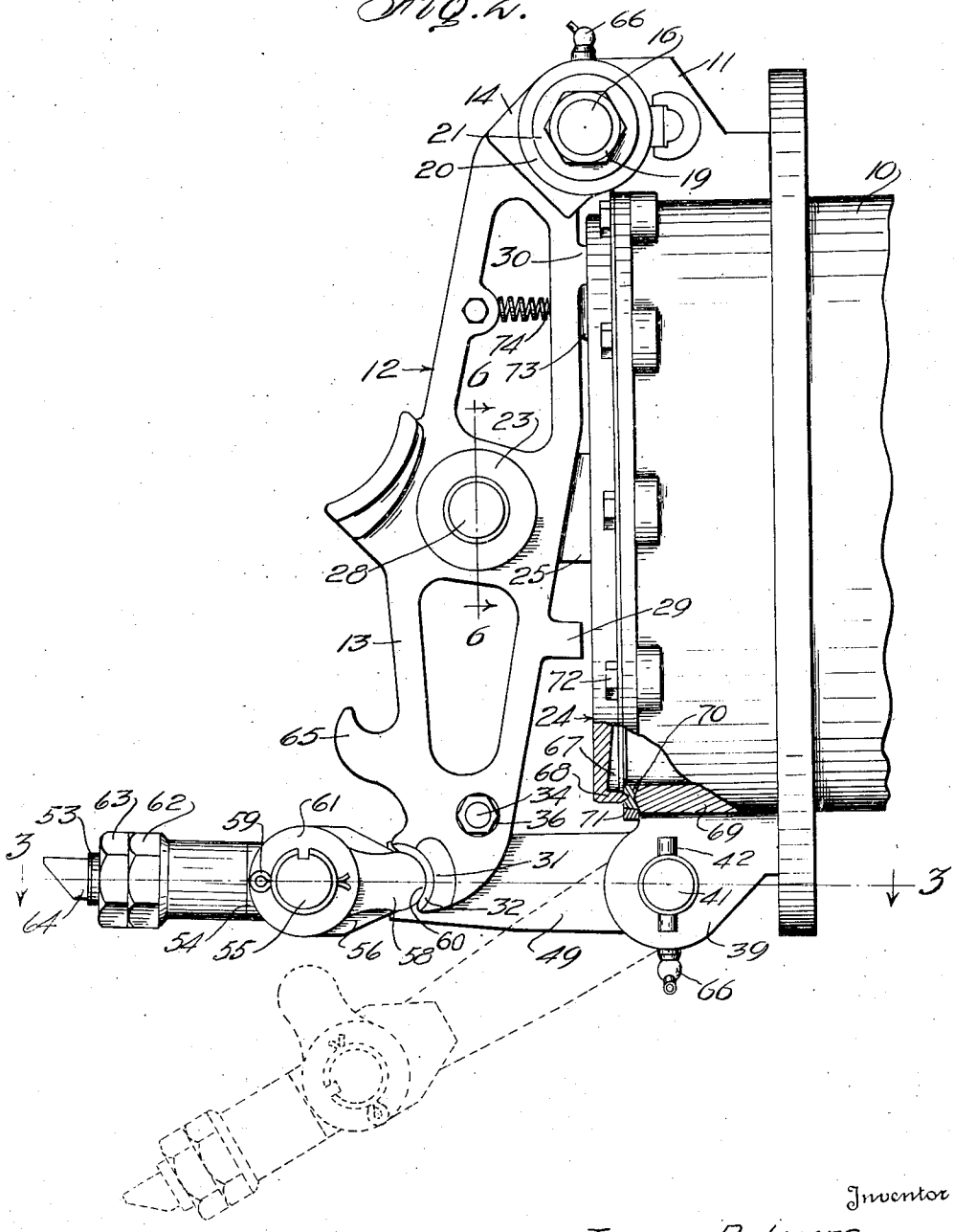
Attorney

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PUFFING GUN LID RELEASE MECHANISM

Filed July 15, 1938 3 Sheets-Sheet 2

Fig. 2.



Inventor

THOMAS R. JAMES,

By Robert E. Sadtler

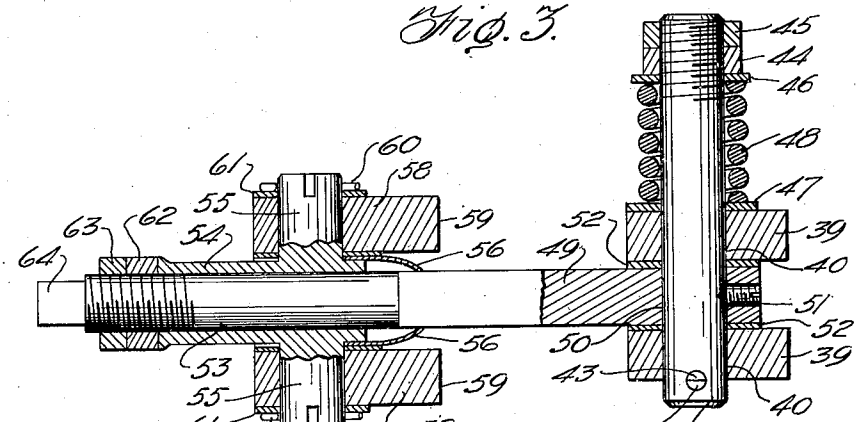
Attorney

Aug. 6, 1940. T. R. JAMES 2,210,294

PUFFING GUN LID RELEASE MECHANISM

Filed July 15, 1938 3 Sheets-Sheet 3

Fig. 3.



Patented Aug. 6, 1940

2,210,294

UNITED STATES PATENT OFFICE

2,210,294

PUFFING GUN LID RELEASE MECHANISM

Thomas R. James, Minneapolis, Minn., assignor to General Mills, Inc., a corporation of Delaware

Application July 15, 1938, Serial No. 219,393

7 Claims. (Cl. 292—259)

This invention relates to the production of puffed cereals and has special reference to a puffing gun closure and release mechanism.

An object of the invention is to provide a simple and efficient mechanism whereby to hold the lid off a puffing gun firmly closed against the escape of air, vapor and the like from the gun during the time the cereal contained in the gun is being subjected to heat prior to the explosion of the cereal grains.

Another object of the invention is to provide a novel mechanism for such purpose which is so arranged that it may be quickly operated to latch the lid in closed position and to effect unlatching of the lid so that it will be blown open by the pressure within the gun.

Another object of the invention is to provide a novel puffing gun closure means including a lid and a latching mechanism, the closure means being so arranged that, upon start of an unlatching movement, the movement of the lid of the gun in opening will effect completion of the latch release.

Still another object of the invention is to provide a novel arrangement of such a device wherein wear will be kept low and wherein any wear which does occur may be readily compensated.

With the above and other objects in view, as will be presently understood, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims.

In the accompanying drawings like characters of reference indicate like parts in the several views, and:

Figure 1 is a face view of the lid provided end of a puffing gun wherein this invention is embodied.

Figure 2 is a side view of the lid and of a puffing gun showing the present invention, the view being partly in section and also showing the latching mechanism in latched position in full lines and in an unlatched position in broken lines.

Figure 3 is a detail section on the line 3—3 of Figure 2.

Figure 4 is a fragmentary detail of a portion of the free end of a lid beam used in this invention.

Figure 5 is an enlarged fragmentary section on the line 5—5 of Figure 4.

Figure 6 is a detail section on the line 6—6 of Figure 2.

In the embodiment of the invention as disclosed in the drawings there is shown a puffing gun body or cylinder 10 open at one end At its open end this cylinder carries a hinge bracket 11 which is fixed on the outer surface of the cylinder wall and projects forwardly beyond the open end of the cylinder 10.

The lid beam is indicated in general at 12 and consists of a pair of complementary members 13 of skeleton form disposed at equal distances from a line extending diametrically across the front of the cylinder 10 and bisecting the bracket 11. Each of the members 13 is provided at one end with an angularly disposed hinge eye 14 and these hinge eyes lie on opposite sides of the bracket 11. Washers 15 are interposed between the proximal faces of the eyes 14 and the side faces of the bracket 11. A pintle 16 extends through the hinge bracket 11 and eyes 14 and is provided on one end with a head 17. The other end of the pintle extends well out from the corresponding eye 14 and is threaded to receive the nut 18 and lock nut 19. A washer 20 is fitted on the pintle 16 to lie against the eye 14 and a second washer 21 is fitted on said pintle to lie against the nut 18. A coiled compression spring 22 surrounds the pintle and bears at its ends on the proximal faces of the washers 20 and 21. By adjustment of the nuts 18 and 19 the spring may be compressed to the desired degree to produce frictional resistance to the turning of the beam 12 about the axis of the pintle 16 for purposes which will be presently understood.

Each member 13 is provided about centrally of its length with a bearing boss 23, these bosses being axially alined. The gun lid, indicated in general at 24, is provided centrally with an outstanding ear 25 which, at its free end portion lies between the bosses 23 and is provided with a cylindrical opening 26 axially alined with the bosses 23. Fitted in the opening 26 is the substantially segmento-spherical central portion 27 of a pivot member having diametrically alined journal arms 28 engaging in the bosses 23. By this means the lid 24 is connected to the lid beam 12 for universal adjustment relative thereto. A stop member 28' projects from the member 13 towards the lid 24 at one side of the pivotal lid connection and a similar stop member 29 projects similarly on the other side of such connection. These stop members limit swinging movement of the lid on the axis of the journals.

The free ends of the members 13 are each provided with an arcuate toggle seat receiving portion 31 wherein is seated an arcuate toggle seat 32 of wear resisting material. These toggle seats face away from the head 24. Projecting from

the proximal sides of the members 13 adjacent the toggle seats 32 is a pair of alined tubular bosses 33 meeting at their free ends to space the members 13. Through the members 13 and the bosses 33 extends a securing bolt 34 having a head 35 on one end bearing against the respective member 13 and carrying at its other end a nut 36 and a lock washer 37. By means of this bolt and nut arrangement the free ends of the members 13 are so connected that the beam 12 forms a practically unitary structure. The bosses 33 have a flat face 38, on the side remote from the hinge of the beam 12, the purpose of which will be presently explained.

The cylinder 10 is provided opposite the hinge bracket 11 with a pair of spaced pivot brackets 39 having alined openings 40 formed therein. These brackets are evenly spaced from the diametrical line between the members 13 and are thus, as a pair, diametrically opposite the bracket 11. Through the openings 40 extends a pivot pin 41 which carries at one end a shouldered pin 42 having its ends projecting through the pin 41 and provided with flat faces forming abutments to engage the outer face of one of the brackets 39. The other end of the pin 41 projects well beyond the outer face of the other bracket 39 and carries at its outer end a nut 44 and a lock nut 45 as well as the washers 46 and 47 which rest respectively against the nut 44 and adjacent bracket 39. A coiled compression spring 48 surrounds the pin 41 and bears at its ends against the washers 46 and 47. A long toggle lever 49 has an opening 50 in one end. This end lies between the brackets 39 and the pin 41 fits in the opening 50. The lever 49 is fixed on the pin against rotation relative thereto by any suitable means such as is here indicated by the set-screw 51. Washers 52 are interposed between the lever 49 and brackets 39. By suitable adjustment of the nuts 44 and 45 the spring 48 is compressed to set up frictional resistance between the washer 47 and pin 42 and the outer faces of the brackets 39. By this means frictional resistance to the swinging movement of the toggle lever is obtained and such frictional resistance may be regulated as desired. The lever 49 has its outer or free end of cylindrical form as at 53, the extremity of this cylindrical portion being screw threaded. Slidably mounted on the lever portion 53 is a sleeve 54 wherefrom projects a pair of diametrically alined journals 55. Mounted on the journals against the sleeve 54 is a pair of leaf springs 56 which have their free ends frictionally engaging opposite sides of the lever 49 for the purpose of resisting movement of the sleeve 54 along the portion 53, and of preventing rotation of said sleeve. Washers 57 on the journals 55 bear against the outer faces of the springs 56 and revolubly mounted on the journals 55 to bear against the washers 57 is a pair of short toggle arms 58 each of which has a segmento-cylindrical free end 59 of the same radius as the seats 32, the ends 59 engaging in said seats when the latching means is latched. These toggles 58 are held on the journals 55 by cotter pins 60 and washers 61, the toggles thus being free to swing on the journals. However, swinging movement of the toggles is resisted by the action of the springs 56. Secured on the arm 53 is a sleeve adjusting nut 62 which bears against the outer end of the sleeve 54 and a lock nut 63 engages the nut 62 for the usual purpose. A bevelled lug 64 projects from the end of the lever portion 53. By means of the nut 62 the sleeve 54 is limited in movement outwardly of the lever 49 so that the distance between the pivotal axis of the lever 49 and the pivotal axis of the toggles 58 may be regulated.

A hook lug 65 is provided on the beam 12 for engagement by a suitable lever or tool to assist in opening and closing the lid and grease fittings 66 are also provided where needed.

As shown in Figure 2, the lid 24 has a bevelled recess 67 extending adjacent its periphery on the side of the lid confronting the cylinder 10. This recess causes the formation of a peripheral flange 68 having a V-shaped edge. The wall 69 of the cylinder 10 likewise has a bluntly V-shaped edge whereon rests a sealing ring or grommet 70 engaged by the edge of the flange 68. The ring 70 is held in place by a keeper ring 71 secured to the cylinder 10 by bolts 72.

In operation the latch is moved from the latching position shown in Figure 2 by pressing down on lug 64. This starts the lever 49 to swing towards the dotted line position thus moving the pivotal axis of the short toggle arms 56 downwardly. It will be noted that in latching position the center line of the lever 49 is inclined slightly upward from the pivotal axis of said lever. That is, the lever 49 is above dead center, further movement in this direction being prevented by engagement of the lever 49 with the flat sides 38 of the lugs or bosses 33. As soon as the lever is moved to incline downwardly from its pivotal axis the force behind the lid 24 will exert a turning movement on the toggle arms 58 quickly causing the parts to assume the positions shown in dotted lines. The frictional resistance induced by the action of the springs 22 will prevent undue movement of the beam 12 and lever 49 so that no violent slamming of the parts occurs. To close and latch the gun after loading with unpuffed cereal, the lid 24 is shut and the lever 49 swung up until the ends 59 of the toggle arms can be swung into their seats on the beam. Then the lever 49 is forced up until it strikes the bosses 33 whereupon the device will be securely latched.

A lug 73 is formed on the lid 24 and is connected by tension springs 74 with the members 13 to hold the lid normally against the stop 30.

What is claimed, is:

1. In latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of said body and extending diametrically across said open end, said lid beam having said lid connected thereto and having a pair of laterally spaced toggle seats formed at its free end and facing outwardly from said body, a toggle lever pivoted to said body opposite said beam hinge to swing into and out of position between said toggle seats, a sleeve slidably mounted on said lever, a pair of alined journals extending laterally from the sleeve, a pair of toggle arms pivoted on said journals and extending toward the pivotal axis of the lever, said toggle arms having free ends engaging in said seats upon the lid being in closed position, a nut secured on the outer end of said lever to engage the sleeve and limit outward movement thereof on the lever, and means frictionally resisting movement of the sleeve on the lever and preventing rotation of the sleeve on said lever.

2. In latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of said body and extending diametrically across said open end, said lid beam having said lid connected thereto and having a pair of laterally spaced toggle seats formed at its free end and facing outwardly from said body, a tog-

gle lever pivoted to said body opposite said beam hinge to swing into and out of position between said toggle seats, a sleeve slidably mounted on said lever, a pair of alined journals extending laterally from the sleeve, a pair of toggle arms pivoted on said journals and extending toward the pivotal axis of the lever, said toggle arms having free ends engaging in said seats upon the lid being in closed position, means to adjustably limit outward movement of said sleeve on said lever on said lever, and a pair of leaf springs carried by said sleeve and having free ends engaging opposite sides of said lever, said lever having flat sides engaged by said springs whereby to prevent rotation of the sleeve and frictionally resist longitudinal movement of the sleeve on the lever.

3. In latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of said body and extending diametrically across said open end, said lid beam having said lid connected thereto and having a pair of laterally spaced toggle seats formed at its free end and facing outwardly from said body, a toggle lever pivoted to said body opposite said beam hinge to swing into and out of position between said toggle seats, a sleeve slidably mounted on said lever, a pair of alined journals extending laterally from the sleeve, a pair of toggle arms pivoted on said journals and extending toward the pivotal axis of the lever, said toggle arms having free ends engaging in said seats upon the lid being in closed position, a nut secured on the outer end of said lever to engage the sleeve and limit outward movement thereof on the lever, means frictionally resisting movement of the sleeve on the lever and preventing rotation of the sleeve on said lever, and means on said beam forming a stop limiting the swinging movement of said lever when in latching position.

4. In latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of said body and extending diametrically across said open end, said lid beam having said lid connected thereto and having a pair of laterally spaced toggle seats formed at its free end and facing outwardly from said body, a toggle lever pivoted to said body opposite said beam hinge to swing into and out of position between said toggle seats, a sleeve slidably mounted on said lever, a pair of alined journals extending laterally from the sleeve, a pair of toggle arms pivoted on said journals and extending toward the pivotal axis of the lever, said toggle arms having free ends engaging in said seats upon the lid being in closed position, means to adjustably limit outward movement of said sleeve on said lever, a pair of leaf springs carried by said sleeve and having free ends engaging opposite sides of said lever, said lever having flat sides engaged by said springs whereby to prevent rotation of the sleeve and frictionally resist longitudinal movement of the sleeve on the lever, and means on said beam forming a stop limiting the swinging movement of said lever when in latching position.

5. In a latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of the body and extending diametrically across said open end, the lid beam having said lid connected thereto and having a pair of laterally spaced toggle seats formed at its free end and facing outward from the gun body, a toggle lever pivoted to the body opposite the beam hinge to swing into and out of position between the toggle seats, a pair of aligned journals extending laterally from the toggle lever, and a pair of toggle arms mounted on these journals and free to rotate independently and completely around the journals, said toggle arms having their free ends engaging in toggle seats of the lid beam when the lid is in closed position, whereby the toggle arms can swing freely about their journals under the force applied by the lid to the lid beam as the latter is suddenly released on outward movement of the toggle lever thereby permitting the sudden outward movement of the lid and the sudden release of pressure within the puffing-gun.

6. In a latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of the body and extending diametrically across said open end, the lid beam having said lid pivotally connected thereto and having an arcuate toggle seat formed at its free end and facing outward from the gun body, a toggle lever carrying a journal aligned parallel to the toggle seat, and a toggle arm mounted on this journal so as to allow complete and independent rotation of each about its journal, the toggle lever being pivoted to the gun body opposite the beam hinge so as to swing into and out of a position that will engage the free end of the toggle arm with the toggle seat of the beam lid, whereby the toggle arms can swing freely about their journals under the force applied by the lid to the lid beam as the latter is suddenly released on outward movement of the toggle lever thereby permitting the sudden outward movement of the lid and the sudden release of pressure within the puffing-gun.

7. In a latching means for a puffing-gun having a body and a lid, a lid beam hinged at one end to the open end of the body and extending diametrically across said open end, the lid beam having said lid pivotally connected thereto and having an arcuate toggle seat formed at its free end and facing outward from the gun body, a toggle lever carrying a journal aligned parallel to the toggle seat, a pair of spaced toggle arms mounted on this journal so as to allow complete and independent rotation of each about its journal and means frictionally resisting rotation of each toggle arm on its journal, the toggle lever being pivoted to the gun body opposite the beam hinge so as to swing into and out of a position that will engage the free end of the toggle arm with the toggle seat of the lid beam whereby the toggle arms can swing freely about their journals under the force applied by the lid to the lid beam as the latter is suddenly released on outward movement of the toggle lever thereby permitting the sudden outward movement of the lid and the sudden release of pressure within the puffing-gun.

THOMAS R. JAMES.