US 20120285982A1

(19) **United States**

(12) **Patent Application Publication**

Strobel-Schmidt et al.

(10) **Pub. No.: US 2012/0285982 A1**

(43) **Pub. Date: Nov. 15, 2012**

(54) **DISPENSING DEVICE**

(76) Inventors: **Rainer Strobel-Schmidt**, Bad Woerishofen (DE); **Christian Hefele**, Breitenbrunn (DE); **Peter Ostermeier**, Diessen (DE); **Hans Peter Lederle**, Durach (DE)

(21) Appl. No.: **13/410,097**

(22) Filed: **Mar. 1, 2012**

(30) **Foreign Application Priority Data**

Mar. 2, 2011 (DE) 102011004971.1

Publication Classification

(51) **Int. Cl.**
B65D 83/00 (2006.01)

(52) **U.S. Cl.** **221/279**

(57) **ABSTRACT**

In a dispensing device for extruding cartridges, with a piston rod and a preferably manually-driven feed mechanism, whereby the feed mechanism has an operating lever, that is moved against a holding lever for squeezing in an extrusion direction (A), and a retaining mechanism that engages with the piston rod to prevent movement of the piston rod against the feed direction (R), it is envisaged that an unlocking mechanism is provided that engages with the retaining mechanism and releases this, whereby the unlocking mechanism may be so selectively coupled with the operating lever that a movement of the operating lever in the extrusion direction (A) releases the retaining mechanism.

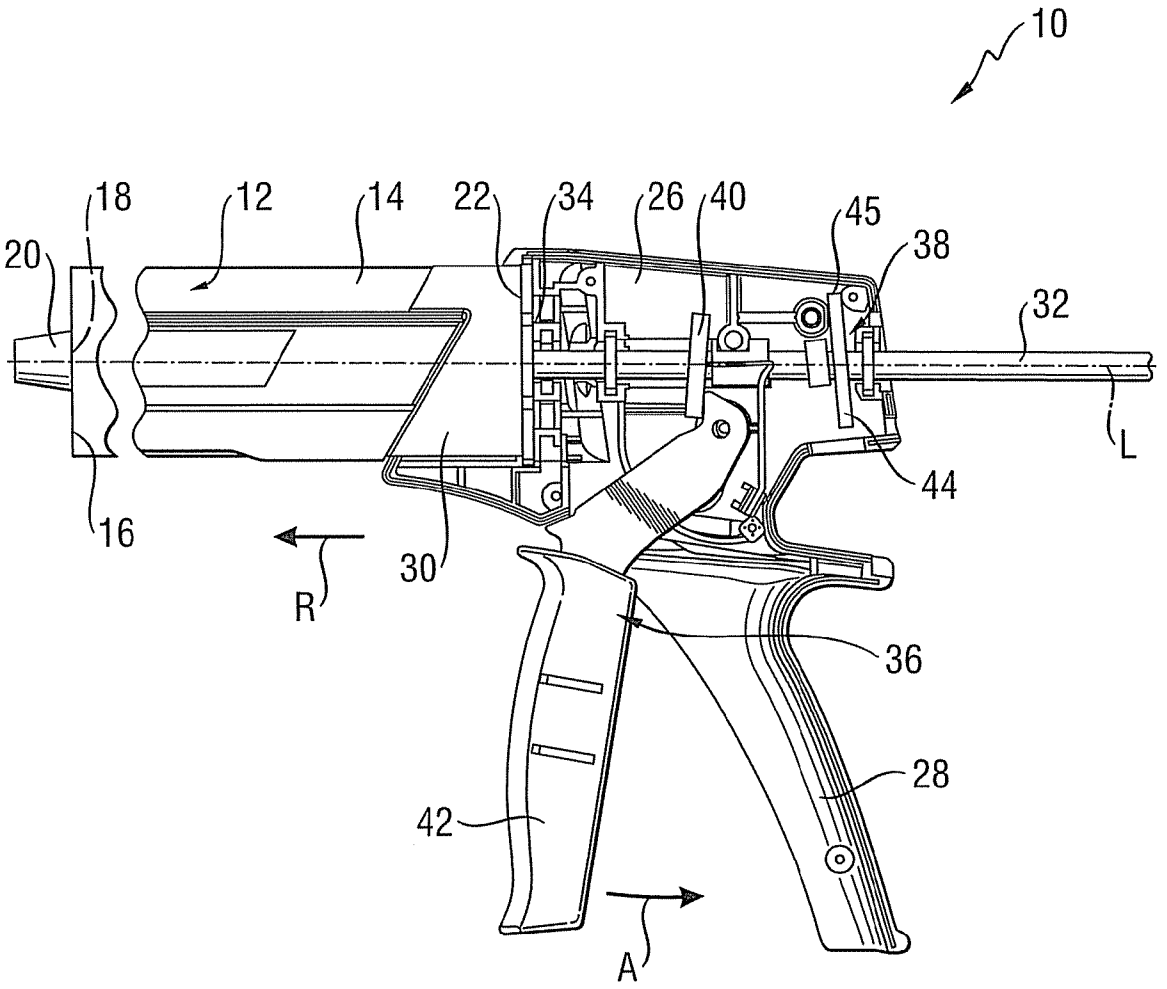


Fig. 1

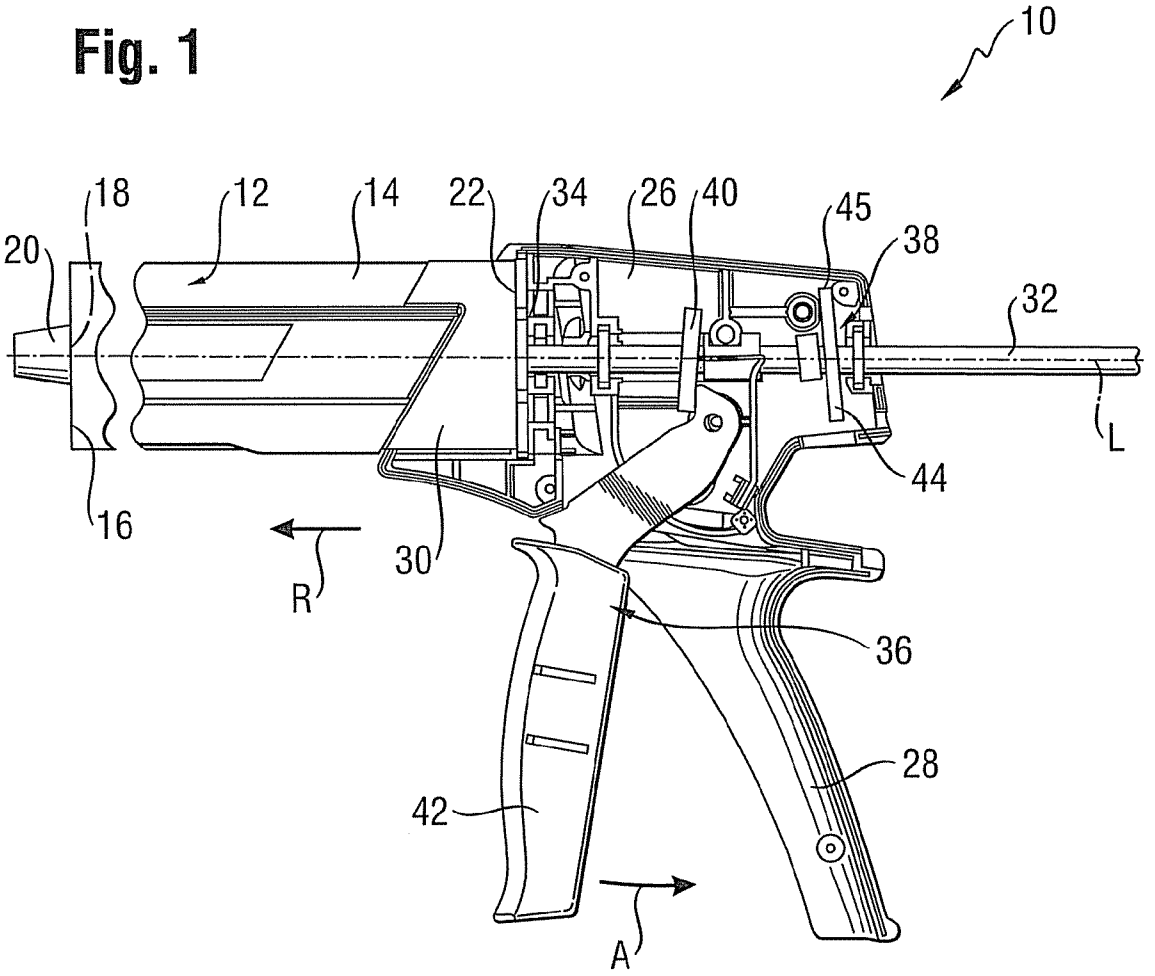


Fig. 2

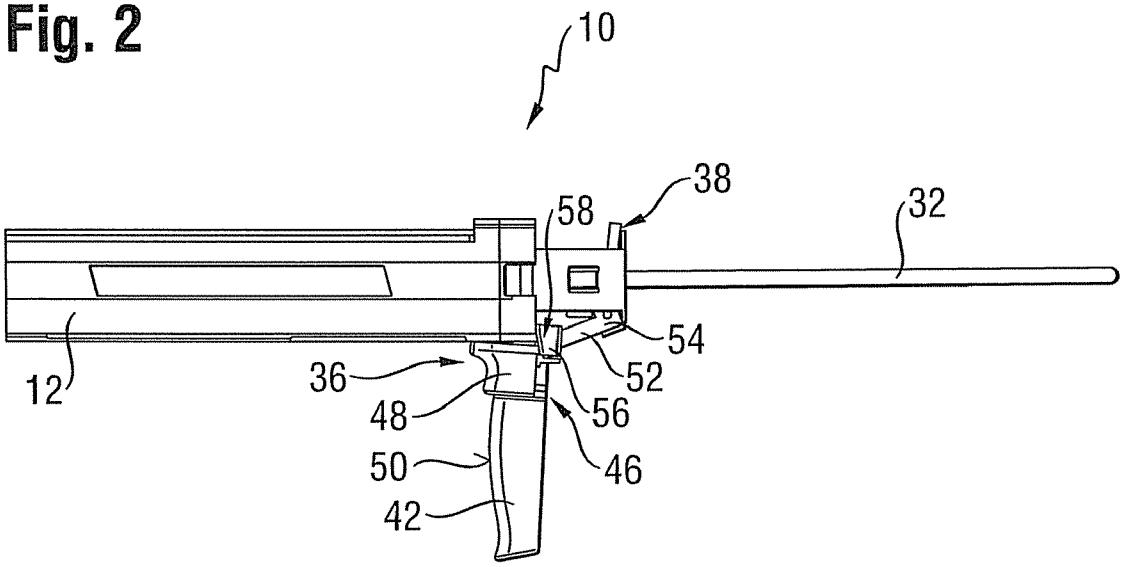


Fig. 3

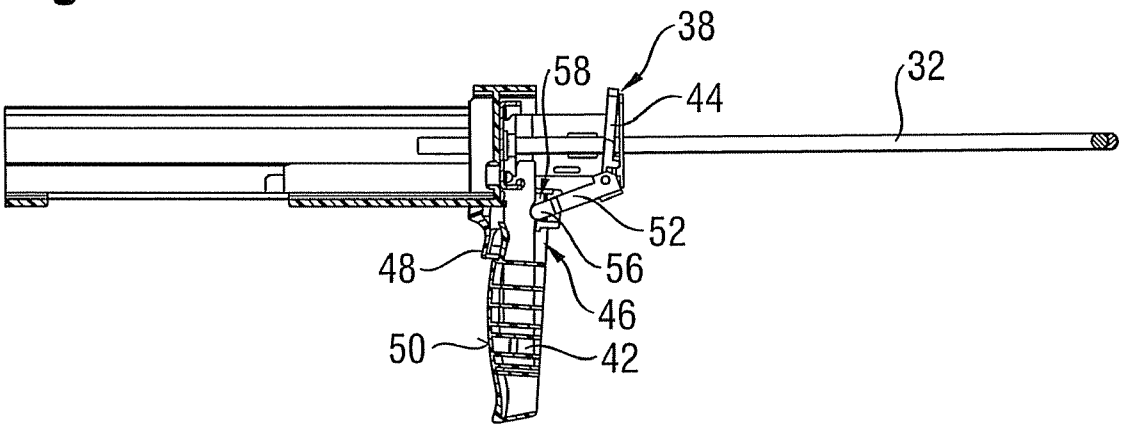


Fig. 4

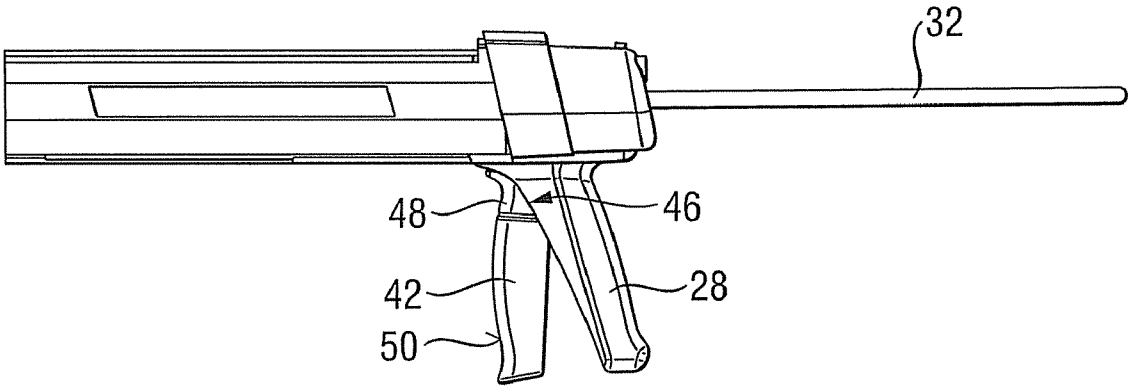
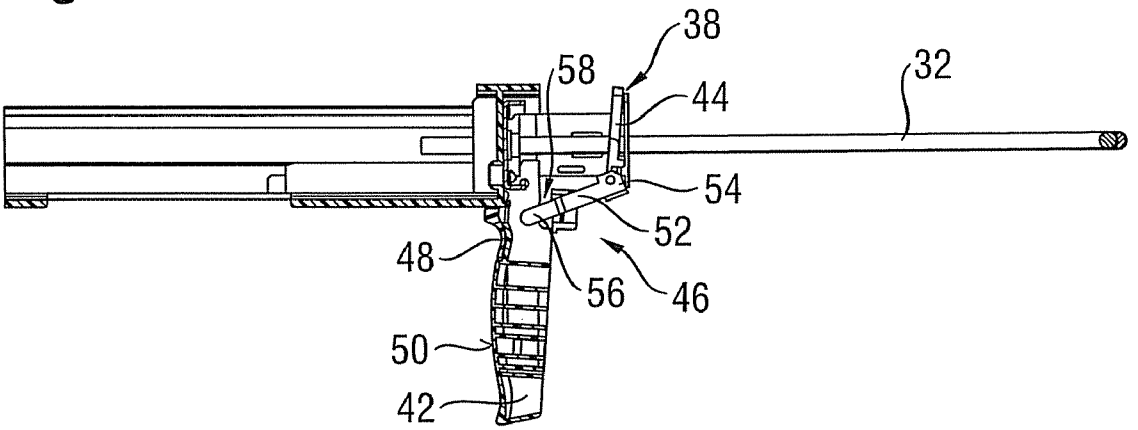


Fig. 5



DISPENSING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to German Patent Application DE 10 2011 004 971.1 filed Mar. 2, 2011, and entitled "Auspressgerat" ("Dispensing Device"), which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a dispensing device for extruding cartridges, with a piston rod and a preferably manually-driven feed mechanism, wherein the feed mechanism has an operating lever that may be moved against a holding lever for extrusion from a dispensing device, and where there is a retaining mechanism that engages with the piston rod to prevent movement of the piston rod against the feed direction R.

[0003] Such dispensing devices are used for example in the construction industry for the extrusion of cartridges that are filled with silicone or another liquid or viscous material. These cartridges usually have a cylindrical body with a discharge port in a front wall. The opposing end wall has a movable plunger in the cylindrical body so that displacement of the end wall changes the volume of the cartridge and thereby extrudes the contents of the cartridge through the discharge port. The dispensing device allows precise dosage and a precise application of the particular building material.

[0004] Typically, the dispensing device has a piston arranged on a piston rod that impacts against a die that serves to press the cartridge against the discharge port. The piston rod is driven by a feed mechanism that may be releasably clamped to this piston rod.

[0005] On releasing the feed mechanism from the piston rod, for example, a retaining mechanism is provided which prevents movement of the piston rod against the feed direction in order to clamp the feed mechanism to the piston rod again so as to carry out a further extrusion process. This ensures that at the beginning of a new pressing process, the die of the piston lies against the cartridge and prevents free movement of the feed mechanism.

[0006] In order to be able to replace the cartridge, or following the end of the pressing process, an unlocking mechanism is provided in order to reduce a possible pressure acting on the cartridge through the piston rod that could lead to excess extrusion of the building material from the cartridge. The unlocking mechanism may disable the retaining mechanism, so that the piston rod may be moved against the feed direction. This type of unlocking mechanism frequently has a lever provided at the back of the dispensing device that, due to its position, may only be operated by the thumb. This operation is often very complicated because the operator has to change the position of his grip on the dispensing device and thus must, for example, release the holding lever of the dispensing device. In addition, a strong hand force is required, especially in the case of viscous materials, and a corresponding high pressure on the cartridge in order to operate the unlocking mechanism.

BRIEF SUMMARY OF THE INVENTION

[0007] One of more embodiments of the present invention provides a dispensing device for extruding cartridges having a piston rod and a preferably manually-driven feed mechanism. The feed mechanism has an operating lever that is moved against a holding lever for squeezing in an extrusion direction (A), and a retaining mechanism that engages with the piston rod to prevent movement of the piston rod against the feed direction (R). An unlocking mechanism is provided that engages with the retaining mechanism and releases it, whereby the unlocking mechanism may coupled with the operating lever so that a movement of the operating lever in the extrusion direction (A) releases the retaining mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. **1** is a sectional view through a dispensing device in accordance with the state of the art,

[0009] FIG. **2** is a side view of a dispensing device according to an embodiment of the invention,

[0010] FIG. **3** is a partial sectional view of the dispensing device of FIG. **2**,

[0011] FIG. **4** shows the dispensing device of FIG. **2** with the actuator in a deactivated position, and

[0012] FIG. **5** is a sectional view of the dispensing device of FIG. **4**.

DETAILED DESCRIPTION OF THE INVENTION

[0013] One or more embodiments of the invention provide a dispensing device, which allows easier operation of the unlocking mechanism as well as operation using a smaller hand force.

[0014] In operation, a dispensing device for cartridges is used with a piston rod and, preferably, a manually-driven feed mechanism, whereby the feed mechanism has an operating lever that may be pressed against a retaining lever in a pressing direction, and with a holding mechanism which engages with the piston rod and prevents movement of the piston rod against the feed direction R; an unlocking mechanism is provided that engages with the retaining mechanism and may release this, whereby the unlocking mechanism may be so coupled with the operating lever that the retaining mechanism is released by a movement of the operating lever in the extrusion direction.

[0015] Thus no operating element is provided to release the unlocking mechanism and via which the release force on the unlocking mechanism and thus on the retaining mechanism would be transmitted. The release force is applied instead via the operating lever, which may be coupled positively with the retaining mechanism via the unlocking mechanism. The operating lever is so coupled with the retaining mechanism that a movement of the operating lever deactivates the retaining mechanism and thus releases the piston rod. On the one hand, this allows easy handling of the dispensing device, as no additional leverage is required. On the other hand, all of one's hand force may be used to activate the unlocking mechanism as the whole operating lever may be gripped. Thus the release of the retaining mechanism is possible with a lower hand force and a lower operating force. In the event that the retaining mechanism is jammed due to a previously applied high operating force or a very viscous building material is applied to the piston rod, it is also possible to exert a much greater release force with the whole hand on the retaining mechanism via the operating lever.

[0016] This is not so in the case of dispensing devices of the state of the art where an additional lever is required, and via which the entire release force must be applied in order to release the piston rod from the retaining mechanism, while

preferably in a dispensing device according to one or more embodiments of the invention, only one actuating element is provided to activate the unlocking mechanism and where the unlocking mechanism is coupled to the retaining mechanism via the operating lever. The operating force required to activate the unlocking mechanism is much lower than the release force as only the coupling of the unlocking mechanism is released. The actual release force is then applied to the retaining mechanism via the operating lever. As no great force is needed with the actuating element, free positioning of the actuator is also possible. Preferably, the operating element is so arranged on the dispensing device that this is achieved without changing the position of the grip.

[0017] In particular, the actuating element may be mounted on the operating lever and is coupled to the operating lever with the retaining mechanism in an unlocking position. In a deactivated position, the actuating element separates the operating lever from the retaining mechanism. The positioning of the actuating element on the operating lever has the advantage that a simple operation of the unlocking mechanism is possible without changing one's grip on the dispensing device.

[0018] Preferably, the actuating element is provided on the retaining lever on the side facing away from the operating lever, whereby the actuating element is flush with a surface of the operating lever in the deactivated position and protrudes from the surface in the unlocking position. The actuating element is, for example, spring-loaded on the operating lever whereby in this unlocking position, the unlocking mechanism is coupled to the operating lever and a movement of the operating lever releases the piston rod.

[0019] The actuating element is thus so arranged on the operating lever that the operator may operate the actuating element with one finger in normal operation of the dispensing device. To move the operating lever, the operator grips the operating lever on the side away from the retaining lever with the fingers and may thus grasp the actuating element and press it against the holding lever in the deactivated position. In this position, the unlocking mechanism is decoupled from the operating lever. The operator may then grasp the operating lever with the whole hand in order to extrude the cartridge.

[0020] After completion of the extrusion process, the operator only needs to let go of the actuating element to allow it to return to the unlocking position in which the unlocking mechanism is coupled to the operating lever. With a further operation of the operating lever, the piston rod is then released. The entire operation of the dispensing device may thus be effected without changing the position of the hand, enabling fast and reliable work.

[0021] The unlocking mechanism, for example, may have a coupling rod, which is positively coupled with the operating lever in the unlocking position of the actuating element and which makes it possible to transfer higher release forces.

[0022] Preferably, the coupling rod is pivotally coupled at one end with the retaining mechanism and at the other end with a guide slot mounted on the operating lever. This means that in the non-activated state of the emergency locking mechanism when there is no positive connection between the operating lever and the retaining mechanism, the coupling rod or the unlocking mechanism are so uncoupled from the operating lever that during the pressing process, no components of the unlocking mechanism are moved.

[0023] In this embodiment, the actuating element is used to couple the coupling rod with the guide slot in the unlocking position, so that a positive connection between the operating lever and the unlocking mechanism is effected.

[0024] The holding mechanism may, for example, comprise a clamping plate that may be tilted with respect to the piston rod. The clamping plate, for example, is spring-loaded to a tilted position with respect to the piston rod so that the piston rod is fixed with respect to the feed direction. If the piston rod is moved, for example by the feed mechanism in the feed direction R, the clamping plate is carried along by the piston rod so that the angle of tilt is reduced with respect to the plane perpendicular to the longitudinal axis of the piston, whereby the tilt of the clamping plate is released. When the feed operation is terminated, the clamping plate springs back sufficiently to enable this to be tilted again with respect to the piston rod to prevent the piston rod from slipping back. This allows for a simple deactivation of the retaining mechanism. The unlocking mechanism may act directly on the clamping plate to reduce the angle of tilt, so that the clamping plate is no longer tilted with respect to the piston rod.

[0025] The feed mechanism may, for example, comprise a drive pulley that is mounted on the piston rod and is tilted with respect to this to move the piston rod in the feed direction. The operating lever may act directly on this drive pulley or through additional components. If the operating lever moves against the holding lever, the operating lever tilts the drive pulley with respect to the piston rod. If the lever is moved further, the drive pulley moves in the feed direction along with the piston rod fixed to the drive pulley and thus the cartridge is extruded.

[0026] Preferably, the feed device is so designed that upon actuation of the unlocking mechanism, this releases the holding device through a movement of the operating lever, before a positive engagement between the feed mechanism and the piston rod is effected. It may occur, for example, that a shorter empty run is provided for the feed mechanism before the feed mechanism is coupled to the piston rod.

[0027] However, it is also conceivable that the feed mechanism could be decoupled from the control lever by actuating the actuating element.

[0028] FIG. **1** shows a general dispensing device **10** for a cartridge **12** which is filled with silicone, for example, or other flowable building material. The building material may be directly filled into the cartridge **12** or stored in an additional bag.

[0029] The cartridge **12** has a cylindrical body **14** having a first front wall **16** and a second opposing end wall **22**. A discharge port **18** is provided on the first front wall **16** to which a nozzle **20** is attached. The opposite end wall **22** is formed by a die that is movable in the cylindrical main body **14** in a feed direction R towards the first end wall **16**.

[0030] When the die is moved in the feed direction R, the volume of the main body **14** is reduced so that the building material is extruded from the discharge port **18**.

[0031] The dispensing device **10** has a housing **26** on which a holding lever **28** and a holding device **30** are provided, into which the cartridge **12** may be fitted so that this is fixed in the dispensing device **10** in the feed direction R. A piston rod **32** is provided on the housing **26**, which is displaceably mounted in the housing **26** in the feed direction R. A piston **34** is provided on the piston rod **32** which may be moved against the die in the feed direction R.

[0032] A feed mechanism **36** is also provided on the housing **26** that engages with the piston rod **32** and may push this in the feed direction R, as well as a retaining mechanism **38**

which may fix the piston rod **32** against movement in the feed direction R as explained below.

[0033] The feed mechanism **36** has a drive pulley **40** as well as an operating lever **42** which is pivotally mounted on the housing **26**. When the operating lever **42** is pivoted in an extrusion direction A against the holding lever **28**, the drive pulley **40** is tilted by the operating lever **42** and tilted on the piston rod **32**. If the operating lever **42** is moved further against the holding lever **28**, the operating lever **42** pushes the drive pulley **40** and the piston rod **32** inclined with respect to the drive pulley **40** in the feed direction R, whereby the piston **34** moves the die **24** in the feed direction R, and the cartridge **12** is extruded.

[0034] When the operating lever **42** is released, this is spring-loaded back opposite to the extrusion direction A into the starting position so that a renewed operation of the operating lever **42** may be effected. A spring element engages with the drive pulley **40**, which solves the tilting of the drive pulley **40** following unloading of the operating lever **42**, and then moves the drive pulley **40** back opposite to the feed direction R to a starting position.

[0035] In order to fix the piston rod **32** following the release of the feed mechanism **36**, so that it is positioned at the beginning of a new feed operation on the cartridge **12** or the die of the cartridge **12** and an empty run of the feed mechanism **36** is prevented, a retaining mechanism **38** is provided in the form of a clamping plate **44**. The clamping plate **44** with its upper edge **45** is pivotally mounted on the housing **26** and is spring-loaded to tilt with respect to the piston rod **32** so that the position of the latter is fixed with respect to the feed direction R.

[0036] If the piston rod **32** is moved by the feed mechanism **36** in the feed direction R, the clamping plate **44** is carried forward by the piston rod **32** so that the angle of tilt is reduced compared to a plane that is perpendicular to the piston longitudinal axis L. Thus, the tilting of the clamping plate **44** is solved and the piston rod **32** may be moved relative to the retaining mechanism **38** in the feed direction R. When the feed process is completed, the clamping plate **44** springs back sufficiently far so that this is again tilted with respect to the piston rod **32** and prevents the piston rod **32** from slipping back against the feed direction R.

[0037] After completion of the extrusion process, the retaining mechanism is deactivated, for example, to be able to take the cartridge **12** out of the dispensing device **10** or to reduce the pressure exerted through the piston rod **32** on the cartridge **12**, so that excess extrusion of the building material from the cartridge is avoided. This is done by manually tilting the clamping plate **44**, whereby the tilting of the clamping plate **44** on the piston rod **32** is solved.

[0038] An unlocking mechanism **46** is provided to deactivate the retaining mechanism **38** in the embodiment shown in FIGS. **2** to **5**. The construction and the mode of operation of the dispensing device **10** shown in FIGS. **2** to **5** correspond substantially to the dispensing device **10** shown in FIG. **1** so that the features described are also present in the dispensing device **10** according to one or more embodiments of the invention. The dispensing device **10** differs only in that the clamping plate **44** is tilted in a clockwise direction with respect to FIG. **3** in order to clamp the piston rod **32**. For reasons of clarity in FIGS. **2** to **5**, individual descriptions of the components that are not required for the functional principle of the unlocking mechanism **46** are omitted.

[0039] The unlocking mechanism **46** has an actuating element **48** which is provided on the holding lever **28** on the opposite side **50** of the operating lever **42**. Furthermore, the unlocking mechanism **46** has a connecting rod **52** whose first end **54** is pivotally coupled to the clamping plate **44** of the retaining mechanism **38** and whose other end **56** is supported in a guide slot **58** on the operating lever **42**. A spring element is provided between the actuating element **48** and the operating lever **42**, which pushes the actuating element **48** away from the surface **50** of the operating lever **42** so that the actuating element **48** protrudes from the surface **50** of the operating lever **42**.

[0040] In the unlocking position shown in the FIGS. **2** and **3**, the operating element **48** blocks the guide slot **58** so that the operating lever **42** is connected positively with the retaining mechanism **38** via the coupling rod **52**. Upon movement of the operating lever **42** in the extrusion direction A, the unlocking mechanism **46** is thus actuated and thus the clamping plate **44** is tilted by the coupling rod **52** so that the tilting of the clamping plate **44** with respect to the piston rod **32** is solved and the retaining mechanism **38** is deactivated.

[0041] In order to start an extrusion process, the actuating element **48** is pressed against the surface **50** of the operating lever **42** so that the actuating element **48** becomes essentially flush with the surface **50** of the operating lever **42** (FIGS. **4** and **5**). In this position of the actuating element **48**, the actuating element frees up the guide slot **58**, so that the coupling rod **52** may move freely in the guide slot **58** and so breaks the positive connection between the operating lever **42** and the retaining mechanism **38** through the unlocking mechanism **46**. Upon movement of the operating lever **42** in the extrusion direction A as described in FIG. **1**, the drive pulley **40** tilts with respect to the piston rod and the piston rod **32** moves in the feed direction R, so that the cartridge **12** is pressed.

[0042] When the extrusion process ends, the actuating element **48** is released, so this may move back from the deactivated position to the unlocking position, in which the guide slot **58** is blocked and the unlocking mechanism **46** is coupled with the operating lever **42**. Subsequently, if the operating lever **42** is actuated again then the piston rod **32** is released.

[0043] In the illustrated embodiment, the operating lever **42** or the position of the drive pulley **40** is so adjusted that on actuation of the operating lever **42**, there follows a shorter empty run of the operating lever **42** in the extrusion direction A before the operating lever **42** is applied to the drive pulley **40**. On the other hand, the unlocking mechanism **46** is so constructed that the empty run of the operating lever **42** is substantially shorter to operate the unlocking mechanism **46** or to deactivate the retaining mechanism **38**. By depressing the actuating element **48**, therefore, there is a deactivation of the retaining mechanism **38** and thus a release of the piston rod **32** before the feed mechanism **36** may act on the piston rod **32**.

[0044] It is also conceivable that the operating lever **42** need only be coupled with the feed mechanism **36** on actuation of the actuating element **48** and is only uncoupled from the operating lever **42** on release of the actuating element **48**, i.e. the positive coupling of the operating lever **42** with the unlocking mechanism **46** of the feed mechanism **36**. It is therefore dependent on the position of the actuating element **48** that determines whether the feed mechanism **36** or the unlocking mechanism **46** is coupled with the operating lever **42**, so that a superposition of functions is excluded.

[0045] The positioning of the actuating element **48** on the operating lever **42** permits extrusion of the cartridge **12** as in a conventional dispensing device **10** with the entire hand force. The activation of the unlocking mechanism may also be made without changing the position of the grip, whereby the actuating element **48** is moved into the unlocking position with one finger. As the grip position does not have to be changed to deactivate the retaining mechanism **38**, fast and reliable work is possible.

[0046] Moreover, it is also possible, for example, to release clamping plate **44** that is strongly clamped as a result of an excessive operating force by a correspondingly high operating force that may be applied via the operating lever **42**.

[0047] As the amount of force to release the retaining mechanism **38** is not applied to the actuating element **48**, but only an operating force that is actually much smaller, the actuating element **48** may also be arranged at another position on the housing **26** or on the dispensing device **10**.

[0048] The coupling of the operating lever **42** with the unlocking mechanism may also be done in a different way. This need not be done with a coupling rod **52** or a guide slot **58**.

[0049] While particular elements, embodiments, and applications of the present invention have been shown and described, it is understood that the invention is not limited thereto because modifications may be made by those skilled in the art, particularly in light of the foregoing teaching. It is therefore contemplated by the appended claims to cover such modifications and incorporate those features which come within the spirit and scope of the invention.

1. A dispensing device for extruding cartridges, said dispensing device including:

a piston rod;

a feed mechanism, whereby said feed mechanism has an operating lever that may be moved against a holding lever to press in a pressing direction, and with a retaining mechanism that may engage with the piston rod in order to prevent movement of the piston rod against a feed direction; and

an unlocking mechanism that engages with said retaining mechanism and releases it, whereby the unlocking mechanism may be selectively coupled with the operating lever that a movement of the operating lever in the extrusion direction causes the retaining mechanism to be released.

2. The dispensing device of claim **1** wherein said feed mechanism is a manually-driven feed mechanism.

3. The dispensing device of claim **1** wherein the unlocking mechanism has an actuating element which is mounted on the operating lever and that couples the operating lever with the retaining mechanism, and in an unlocking position while in a deactivated position it separates the operating lever from the retaining mechanism.

4. The dispensing device of claim **3** wherein the actuating element on the holding lever is provided on the opposite side of the operating lever, wherein the actuating element in the deactivated position is flush with a surface of the operating lever and protrudes in the unlocking position of the said surface.

5. The dispensing device of claim **3** wherein the unlocking mechanism has a coupling rod, which is positively coupled with the operating lever in the unlocking position of the actuating element.

6. The dispensing device of claim **4** wherein the unlocking mechanism has a coupling rod, which is positively coupled with the operating lever in the unlocking position of the actuating element.

7. The dispensing device of claim **5** wherein the coupling rod with one end is pivotally coupled with the retaining mechanism and is supported at the other end by a guide slot on the control lever.

8. The dispensing device of claim **6** wherein the coupling rod with one end is pivotally coupled with the retaining mechanism and is supported at the other end by a guide slot on the control lever.

9. The dispensing device of claim **7** wherein in the unlocking position, the actuating element couples the coupling rod with the guide slot.

10. The dispensing device of claim **8** wherein in the unlocking position, the actuating element couples the coupling rod with the guide slot.

11. The dispensing device of claim **1** wherein the retaining mechanism has a clamping plate that may be tilted with respect to the piston rod.

12. The dispensing device of claim **1** wherein the feed mechanism has a drive pulley which is supported on the piston rod and is tilted on this to move the piston rod in the feed direction.

13. The dispensing device of claim **1** wherein, upon actuation of the unlocking mechanism, this releases the retaining mechanism by a movement of the operating lever before a positive connection is established between the feed mechanism and the piston rod.

14. The dispensing device of claim **1** wherein the unlocking mechanism is deactivated upon actuation of the feed mechanism.

* * * * *