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CAULKING GUN AND CARTRIDGE THEREFOR

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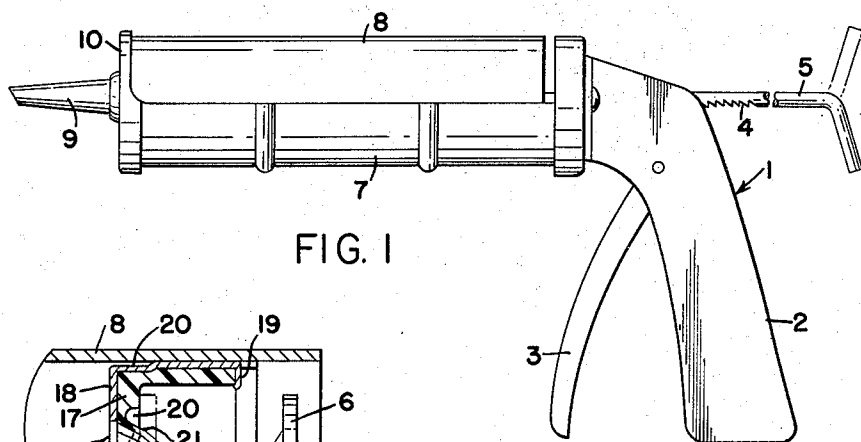


FIG. 1

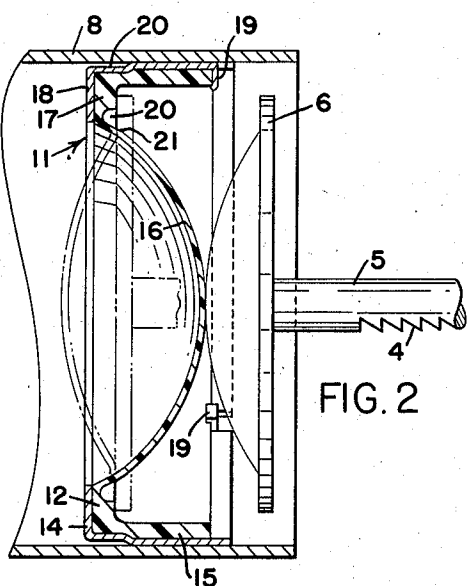


FIG. 2

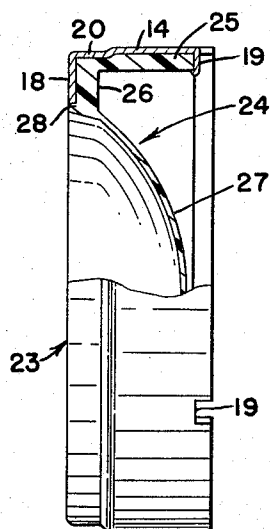


FIG. 3

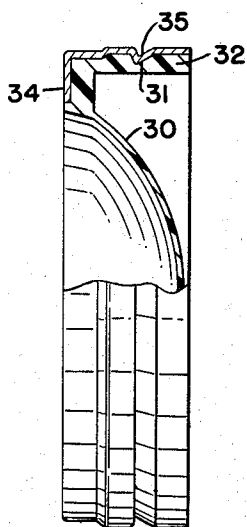


FIG. 4

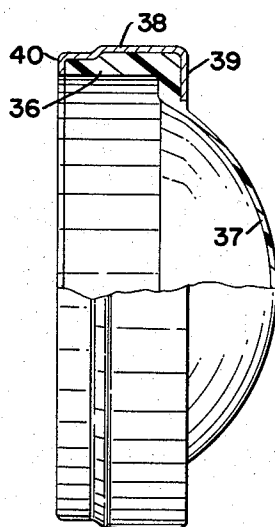


FIG. 5

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CAULKING GUN AND CARTRIDGE THEREFOR

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2 Claims. (Cl. 222—327)

The present invention relates generally as indicated to a caulking gun and cartridges therefor, and more particularly, to a caulking assembly that employs a disposable cartridge having a dispensing spout at one end and a piston at the other end.

Caulking guns that employ such disposable cartridges are of course, well-known in the art, and for the most part, they comprise a gun which supports the cartridge and which is provided with a lever-actuated plunger that is adapted to engage and to move the cartridge piston toward the spout. Thus, axial movement of said piston exerts pressure on the caulking material and displaces the same through the dispensing spout of the cartridge. An annoying problem encountered with this type of caulking assembly is that when the assembly is set aside after use, the caulking material remaining in the cartridge expands and thus oozes or drips from said spout, this evidently being due to the relatively high compressibility and relatively slow recovery of the caulking material, and, perhaps to some extent, especially with a paper cartridge, to slight swelling of the cartridge body. The expression of the caulking material from the spout builds up pressure in the cartridge with resulting compression of the material which, unless permitted to expand within the cartridge, will subsequently expand through the spout. This oozing problem has been solved by me in a number of different ways, one of which is to use a composite cartridge piston comprising an outer ring that has a tight sliding fit in the cartridge body to prevent leakage, an inner ring telescoped within said outer ring, and a flexible diaphragm or membrane clamped between said rings to extend across the opening in said inner ring. I have also developed a two-piece cartridge piston in which the laterally flexible diaphragm or membrane has its periphery wedged between a supporting ring and the inner wall of the cartridge. In addition to the foregoing I have employed a molded cartridge piston formed with a heavy skirt for engagement with the cartridge wall and with a bowed flexible center portion or diaphragm. The cartridge pistons formed as above, have a flexible center portion that permits the caulking material to expand freely thereby bulging the diaphragm through the opening in the inner ring or in the supporting ring or in the skirt, as the case may be, whereby expansion of the caulking material is accommodated by such laterally flexible diaphragm in preference to the material oozing out of the dispensing spout. The foregoing inventions are disclosed in my Patent No. 2,778,541, dated January 22, 1957, and in my copending applications Serial No. 614,960, filed October 9, 1956, and now abandoned, and Serial No. 634,691, filed January 17, 1957, now Patent Number 2,833,451.

It is a principal object of this invention to provide a caulking assembly and cartridge that achieves the desired results in somewhat the same manner as disclosed in said patent and copending applications, but which enables use of a cartridge piston that is molded of flexible plastic material such as polyethylene, for example, to provide

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the desired flexible center portion, the skirt thereof snugly telescoped and locked within the skirt of a surrounding non-yielding ring and said ring, in turn, having its skirt tightly fitting within the cartridge body to prevent leakage of caulking material therepast despite expansion or swelling of the cartridge body under the influence of pressure applied on the caulking material as the cartridge piston is moved axially in said body toward the discharge nozzle or spout of the body.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features herein-after fully described and particularly pointed out in the claims; the following description and the annexed drawing setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a side elevation view showing a typical use of this invention;

Fig. 2 is a fragmentary cross section view on somewhat enlarged scale showing the laterally flexible closure wall of the cartridge as laterally flexed by the expansion of the caulking material when the axial force of the plunger of the caulking gun is released; and

Figs. 3, 4, and 5 are elevation views, partly in section, showing other forms of cartridge pistons according to this invention.

Referring now in detail to the drawing, the caulking gun is generally designated by the reference numeral 1, and includes the usual form of handgrip 2, and a trigger or actuating lever 3, the latter being effective when pulled toward the handgrip 2 to actuate a ratchet mechanism (not shown) that engages the teeth 4 of the rod 5 so as to incrementally axially advance said rod toward the left. As is well-known in the art, said rod 5 when turned about its longitudinal axis effects disengagement between said ratchet mechanism and the teeth 4 so that said rod and the plunger 6 affixed thereto, may be withdrawn toward the right. When the plunger 6 and rod 5 are thus withdrawn, the semi-circular cartridge support saddle 7 is disposed to receive a cylindrical cartridge 8, the dispensing spout 9 of which is inserted through the central opening of a plate 10 at the left end of said saddle 7. With the cartridge 8 positioned as shown in Fig. 1, the lever 3 may be actuated to cause the plunger 6 to enter the right-hand end of said cartridge.

The cartridge 8 itself, may comprise a thin sheet metal tube or a paper tube. Within the right-hand end of said cartridge 8 is a composite piston 11 of which the inner part 12 may be made of flexible organic plastic material such as polyethylene or like plastic, which is inert to the caulking material and of which the outer part 14 is radially non-yieldable and made of thin sheet metal, for example. Said piston part 12 is integrally formed with an axially extending skirt 15 which is snugly fitted in the skirt of the piston part 14 and, in turn, the skirt of part 14 is snugly fitted in the cartridge 8 to prevent leakage of the caulking material. Said piston part 12 is additionally formed with a relatively thin and laterally flexible closing wall 16 extending across the opening in the skirt 15. The body of cartridge 8, especially when made of paper, will generally be lined, as by spraying, with a suitable oil impervious material to prevent leakage or penetration of the oils of the caulking material through the wall of said cartridge body.

Initially, such closure wall 16 will be bulged convexly outwardly as best shown in Fig. 2. However, when the plunger 6 is moved toward the left the bulge of said

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wall 16 will be reversed as shown in dotted lines in Fig. 2 and as the movement of the plunger 6 is continued toward the left the peripheral flange of said plunger 6 will engage the intumed flange 17 of the piston part 12 which, in turn, abuts the intumed flange 18 of piston part 14 whereupon the piston 11 will be bodily moved toward the left to displace the caulking material under pressure through the dispensing spout 9.

Now, when the rod 5 is turned to the dotted position of Fig. 1, the expansion of the caulking material will cause said closure wall 16 to bulge convexly outwardly and such lateral flexing of said closure wall occurs with such ease that the caulking material will not have an opportunity to ooze or drip from the end of the dispensing spout. Thus, when the present caulking assembly is set aside after use, there will be no objectionable dripping or oozing of the caulking material from said spout 9.

While in Fig. 2 the plunger 6 has been shown with a convex central portion, it is to be understood that said plunger 6 may be in the form of a flat or otherwise formed plate. Of course, in the case of a plunger 6 in the form of a flat circular plate the volume of caulking material handled by the rearward bulging of the diaphragm 16 will be less than when the plunger 6 is formed as shown in Fig. 2.

In order to securely lock the inner piston part 12 and the outer piston part 14 together the latter may be formed with lugs 19 struck in from the skirt thereof to provide abutments against rearward axial separation of the inner plastic part 12 from the outer sheet metal part 14.

In the case of a piston 11 which is of approximately $1\frac{7}{8}$ " diameter the outer piston part 14 may be formed by drawing or stamping operations from thin sheet metal of a thickness from about .010" to about .015", for example, and in order to facilitate entry of the piston 11 into the end of the cartridge 8 the end thereof is slightly rounded and of reduced diameter, as indicated by the reference numeral 20, to effect a wedging action when the piston 11 is first inserted. The skirt 15 of the inner flexible plastic part 12 may be of about .040" thickness while the diaphragm 16 is, say, about .015" thickness. The inner part 12 is formed with a groove 20 between the intumed flange 17 and the outer periphery of the diaphragm 16 to provide a zone 21 about which the diaphragm 16 is easily flexed forwardly from its rearwardly convexly bowed condition, as shown in Fig. 2.

In Fig. 3 there is shown a slightly modified form of composite piston 23 of which the outer part 14 may be identical with the outer part 14 as shown in Fig. 2, and thus the same reference numerals have been used in connection with the outer part 14 as shown in Fig. 3. In this case the inner part 24 which is formed of polyethylene, or like flexible plastic material, is molded with an integral skirt 25 which corresponds with the skirt 15 in Fig. 2 and with an intumed flange 26 against which the plunger 6 is adapted to abut. The inner part 24 is formed with an integral rearwardly extending convex diaphragm 27 which is adapted to be deformed to flat or reversely bowed form when the piston 23 is actuated axially in the cartridge 8 by the plunger 6. Again as before, when the pressure on the plunger 6 is released the caulking material under pressure is capable of freely expanding to return the diaphragm 27 to its original condition, as shown in Fig. 3, whereby the caulking material will expand in the cartridge assembly rather than oozing or dripping from the spout 9. In Fig. 3 the inner piston part 24 at the junction of the diaphragm 27 with the intumed flange 26 is formed with a forwardly extending annular lip 28 which closely fits in the opening through the intumed flange 18 to provide an additional zone of sealing and also to reinforce the

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diaphragm 27 in the zone about which flexing occurs. The diaphragm 27 is made somewhat deeper than the diaphragm 16 to accommodate a greater volume of the caulking material. Thus, the piston 23 in Fig. 3 may be better suited for use with a plunger 6 that is of flat form.

The composite piston illustrated in Fig. 4 comprises an inner part 30 which, except for the peripheral groove 31 around the skirt 32, may be identical with inner part 24 in Fig. 3; and an outer part 34 which is formed to provide an intumed bead or rib 35 that is complementary with the groove 31 to lock the parts 30 and 34 together. In order to facilitate assembly and in order to securely lock these parts together one side of the groove and rib is tapered for wedging action when the parts are pushed together whereas the other side is more nearly radially disposed so that axial separation is practically impossible except by a prying action which cannot occur in the normal use of the cartridge 8.

In the form of the invention shown in Fig. 5, there is again provided an inner part 36 having an outwardly bowed diaphragm 37 for engagement by a plunger 6, and an outer part 38 that has an intumed flange 39 at one end for engagement by the rim of the plunger 6, said flange 39 also serving to prevent the inner part 36 from being "blown out" of the outer part 38. However, to prevent damage to the cartridge the leading edge 40 is curled in and this curling in may be utilized to tightly press the rear face of the inner part against flange 39 to insure a leak-proof joint.

It is to be noted that the rib 35 in Fig. 4 and the lugs 19 in Figs. 3 and 2 may have this same function of achieving fluid-tight engagement of inner part with the flanges of the outer parts.

In conclusion, it can be seen that I have provided a caulking gun cartridge which has therein an efficient and simplified form of composite piston which has an easily flexed diaphragm but yet which has a strong non-yielding skirt portion which can be snugly fitted in the cartridge body 8 to establish a leak-proof joint between the wall of the cartridge body 8 and the skirt of the composite piston. Moreover, the parts constituting the composite piston have a leak-proof connection between them and are locked together against separation.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. An anti-ooze caulking assembly comprising a caulking gun provided with an axially movable plunger and including means for incrementally advancing said plunger; and a cylindrical cartridge containing caulk and provided with a dispensing spout on one end and with a piston in the other end, said cartridge being held by said gun for axial movement of said plunger into engagement with said piston to move the piston axially in said cartridge to displace under pressure caulk therein through said dispensing spout, said piston including an outer metallic part that is radially rigid and is formed with an axially extending skirt which has a wedge shaped leading end portion to facilitate insertion of said piston into said cartridge body and an adjoining cylindrical skirt portion tightly fitted in said cartridge body, said leading end portion having a radially inwardly extending flange portion forming a central aperture through said outer metallic part; and an inner molded plastic part closing such aperture to the passage of caulk there-through, said inner part being formed with a central portion convexly bowed toward said plunger, said central portion of said inner part axially corresponding to such aperture, said plunger being shaped initially to contact said central convexly bowed portion to deform

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the same toward said spout whereby, upon release of axial pressure on said plunger, the compressed caulk in said cartridge in expanding is effective readily to restore said central portion to its initial convexly bowed form rather than to ooze from said spout, said inner molded plastic part also including an outer circumferential more rigid portion; and locking means holding said metallic outer part and said inner molded plastic part against relative axial movement, said locking means including axially spaced radially overlapped surfaces on said inner and outer parts to form a unitary piston of said inner and outer parts.

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2. The assembly set forth in claim 1 wherein said locking means includes a radially inwardly extending rib on said outer metallic part mating with a complementary groove in the circumferential more rigid portion of said inner molded plastic part.

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Disclaimer

2,920,797.—*William A. Sherbondy*, Cleveland Heights, Ohio. CAULKING GUN
AND CARTRIDGE THEREFOR. Patent dated Jan. 12, 1960. Disclaimer
filed Aug. 24, 1962, by the inventor.

Hereby enters this disclaimer to claim 1 of said patent.
[*Official Gazette October 2, 1962.*]