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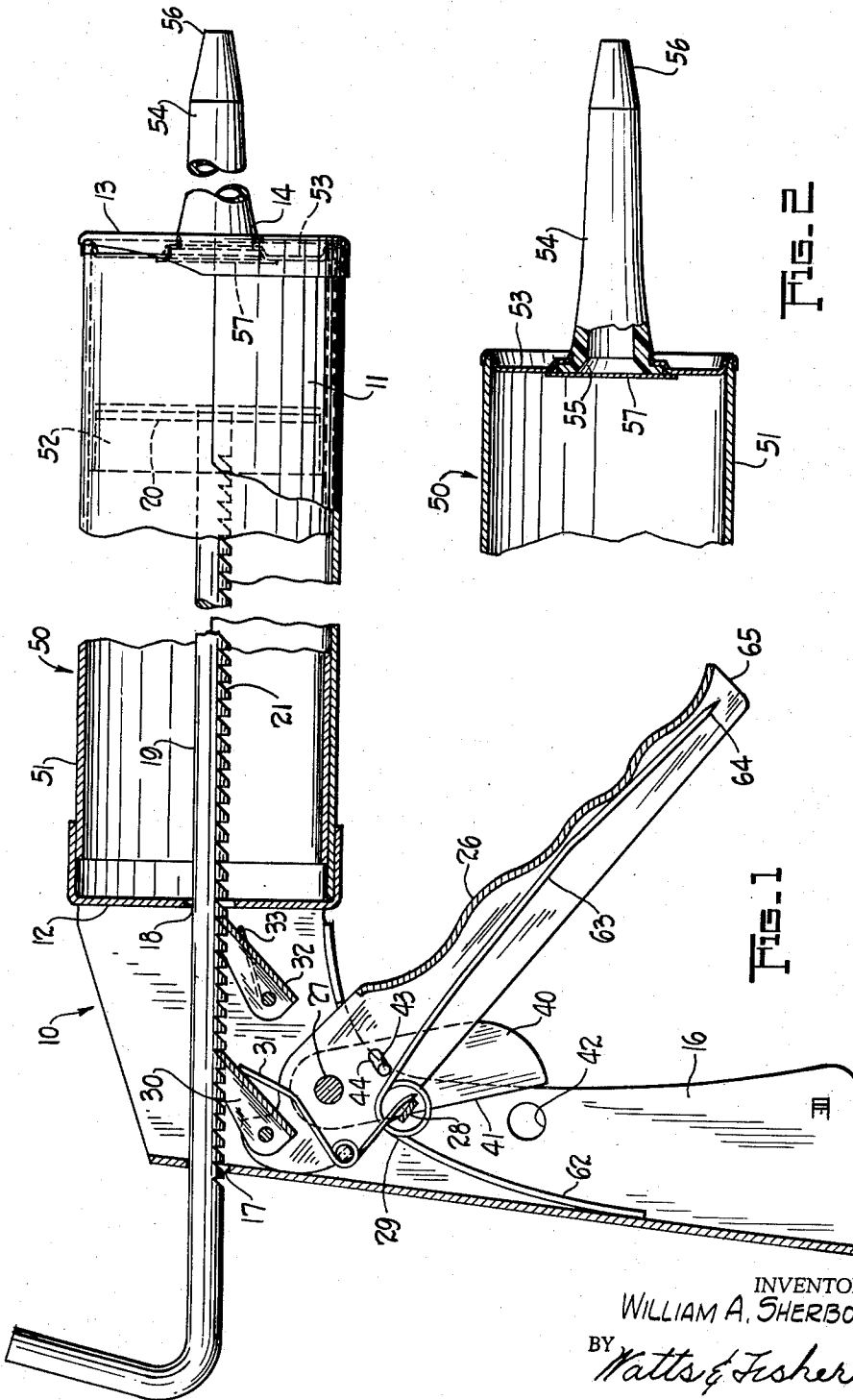
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3,189,226

CALKING ASSEMBLY

Filed March 4, 1963

2 Sheets-Sheet 1



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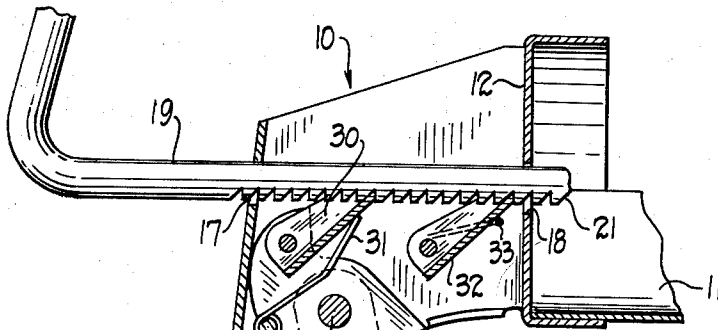


FIG. 3

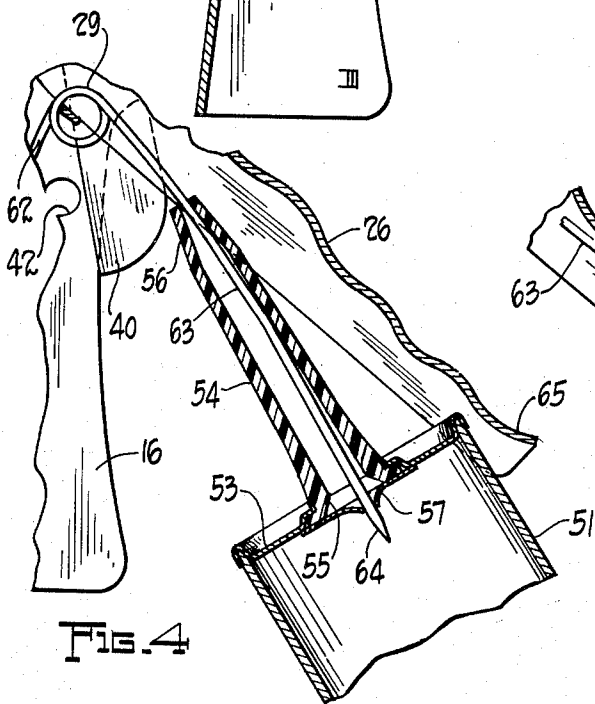


FIG. 4

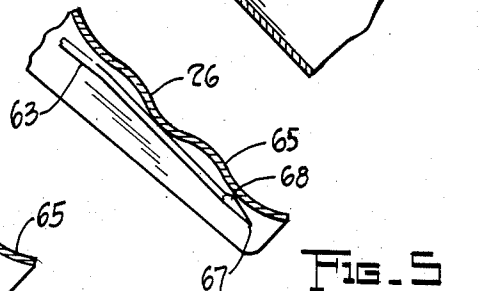


FIG. 5

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CALKING ASSEMBLY

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This invention relates generally to calking apparatus, and more specifically to calking apparatus of the type including a manually actuatable gun which is used to express calking material from disposable cartridges.

The usual gun construction includes a barrel for holding the calking cartridges, a pistol grip handle connected to one end of the barrel, and a manually actuatable trigger pivotally connected to the handle. A reciprocal plunger is provided in the gun barrel for acting on the cartridge and a suitable ratchet mechanism is interposed between the trigger and the plunger to selectively advance the plunger against the cartridge when the trigger is actuated.

One commonly used calking cartridge includes a paper tube for holding the calking material. In order to force the calking material from the tube, a piston is positioned in one end of the tube to be acted on by the plunger of the gun. A funnel-like plastic nozzle is carried by the other end of the tube so that the calking material can be forced through the nozzle. These plastic nozzles are frequently molded with closed outlet ends in order to provide an air seal which prolongs the shelf life of the tube by preventing the calking material from drying out. According to the invention described in the copending application Serial No. 113,786 of William A. Sherbondy, filed May 31, 1961, the gun may be provided with a shearing blade for trimming the closed ends of the nozzles to prepare them for use.

It has now been found that the air seal of the calking cartridge can be improved by sealing the inlet ends of the nozzles by means of thin diaphragms formed of metal or the like. This invention is directed to an improvement of the calking apparatus generally described above which includes structure for puncturing the diaphragms after the ends of the nozzles have been trimmed away. This structure forms an integral part of the calking gun and thus provides a specialized gun assembly which is operable to prepare the cartridges for use, as well as to apply the calking material.

In general, the preferred embodiment of the invention contemplates a trigger spring having a trigger-engaging leg which exceeds the length of the nozzle between its inlet and outlet ends. This spring leg terminates adjacent the free end of the trigger and has its terminal end bent out of engagement with the trigger. The trigger is of U-shaped cross-section in a plane transverse to its axis and has a width at its free end which exceeds the diameter of the nozzle at its outlet end.

In use, the bent terminal end of the spring leg is freely insertable through the nozzle to puncture the diaphragm so that the calking material can be forced through the nozzle by operation of the gun. This operation is quickly and easily accomplished without the necessity of employing a separate tool from the gun and cartridge assembly.

Other features and advantages of the invention will become apparent from the following detailed description when taken in conjunction with the accompanying drawings.

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In the drawings:

FIGURE 1 is a foreshortened side elevational view of the gun and cartridge assembly with portions broken away;

FIGURE 2 is a fragmentary, cross-sectional view of the calking cartridge;

FIGURE 3 is a fragmentary, cross-sectional view illustrating a preliminary stage in the diaphragm puncturing operation;

FIGURE 4 is a view similar to FIG. 3, but illustrating another stage in the diaphragm puncturing operations; and

FIGURE 5 is a fragmentary view illustrating a modified construction of the trigger spring.

Referring now to the drawings, and to FIG. 1 in particular, the calking gun is generally indicated by reference numeral 10. In the embodiment shown, the gun 10 includes a semi-cylindrical barrel 11 which is closed at one end by an inlet cap 12 and at the opposite end by an outlet cap 13. The outlet cap 13 is provided with a U-shaped access slot 14.

A pistol grip handle 16 is secured to the inlet cap 12, and both members are provided with aligned holes 17 and 18, respectively. Through these holes extends a plunger rod 19 which carries a head 20 that is disposed in the barrel 11 for axial movement. Substantially the entire length of the rod 19 on one side is formed with ratchet teeth 21.

A trigger 26 is pivotally connected to the handle 16 by a pivot member 27. As generally described above, the trigger 26 is preferably of U-shaped cross-sectional configuration in a plane transverse to its axis. The sides of the trigger are connected by a transverse member 28 and on this member is mounted a trigger spring 29 which will hereinafter be described in more detail. The trigger 26 also carries a pivotally mounted actuating pawl 30 and a spring 31 which acts to press the pawl into operative engagement with the teeth 21 of the plunger rod 19. As will be apparent from this description, the plunger head can be selectively advanced toward the outlet cap 13 by actuation of the trigger. A holding pawl 32 is pivotally mounted within the handle 16 and is pressed into engagement with the teeth 21 by a spring 33. This pawl serves to hold the plunger in an advanced position when the trigger is released.

In the illustrated embodiment of the gun 10, a shearing blade 40 is mounted on the pivot member 27. The blade 40 has a shearing edge 41 adjacent a hole 42 in the handle 16. The blade also is shown as having a projection 43 which extends into a lost motion slot 44 formed in one side of the trigger 26. This structure forms a shearing mechanism which is operable to trim the outlet end of a cartridge nozzle positioned in the hole 42. By pulling the trigger toward the handle, the blade 40 is caused to move across the hole to shear the end of the nozzle.

Mounted within the gun barrel 11 is a cartridge 50 which contains the calking material. As shown, the cartridge 50 includes a paper tube 51. An axially movable piston 52 is positioned in the end of the tube adjacent the inlet cap 12 so that it can be acted on by the confronting plunger head 20. The opposite end of the tube 51 is provided with a metal end cap 53. This cap carries a funnel-like, plastic nozzle 54 which rests in the bottom of the access slot 14. The nozzle 54 has an enlarged inlet end 55 and an outlet end 56 which extends be-

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yond the outlet cap 13. In order to provide the improved air seal mentioned above, the inlet end 55 of the nozzle is normally closed by a thin metal diaphragm 57.

Referring now to the details of the spring 29, this spring is shown in FIGS. 1, 3 and 4, as having a leg 62 which extends in engagement with the handle 16 and an opposed leg 63 which engages the trigger 26. With this arrangement, the spring constantly urges the trigger away from the handle. In accordance with the present invention, the spring leg 63 has a pointed, terminal end 64 which is adjacent the free end 65 of the trigger 26. It will be seen that the trigger-engaging spring leg is bent intermediate its length so that the pointed end 64 is spaced away from the bottom wall of the U-shaped trigger. The length of this spring leg 63 exceeds the distance between the inlet and outlet ends of the nozzle 54.

The operation of the invention will be most readily apparent by considering FIGS. 3 and 4 in conjunction. As generally described above, the width of the trigger at its free end 65 is made greater than the diameter of the nozzle at its outlet end 56. Because of this construction, the bent terminal end 64 of the spring leg 63 is freely insertable into the trimmed outlet end of the nozzle, as shown in FIG. 3. As the spring leg is thus inserted into the nozzle, the bent terminal end portion allows the spring leg easily to be cammed away from the trigger. This action of inserting the spring leg 63 into the nozzle and camming the leg away from the trigger is continued until the terminal end 64 punctures the diaphragm 57, as illustrated in FIG. 4. If the hole produced in the diaphragm is not sufficiently large to permit the calking material to be forced through the nozzle in operation of the gun, the spring leg 63 can be partially withdrawn from the nozzle, the cartridge rotated, and then the puncturing action repeated until the diaphragm is fully broken away. Usually, however, the formation of a single hole is sufficient, since the pressure exerted by the calking material when the gun is operated will tear the remaining portions of the diaphragm.

Reference is now made to the modified embodiment of the invention illustrated in FIG. 5. As here shown, the trigger-engaging spring leg 63, which may be substantially straight as in conventional constructions, has a flat end portion which terminates at a point 67. This flattened end portion also is formed to have a laterally projecting barb 68 which is spaced from the point 64 and which extends toward the bottom wall of the U-shaped trigger 26. The flattened end of the spring leg, including the point 67 and the barb 68, can be easily formed by a simple swaging operation.

The barb 68 advantageously assures that the point 67 is spaced from the bottom wall of the trigger so that the diaphragm puncturing operation can be carried out in the manner described above in connection with FIGURES 3 and 4. When this puncturing operation is performed, the barb also assures that the diaphragm 57 will be substantially completely ruptured by a single insertion of the spring leg therethrough.

It will be apparent from the foregoing that the construction of this invention is inexpensive and yet provides for a completely integrated calking assembly including a cartridge and a gun which is capable of preparing the cartridge for use. Many variations and modifications of this construction will be apparent to those skilled in the art in view of the foregoing detailed disclosure. Therefore, it is to be understood that, within the scope of the appended claims, the invention can be practiced otherwise than as specifically shown and described.

What is claimed is:

1. A calking apparatus comprising a gun including a barrel, a handle connected to one end of said barrel, and a trigger pivotally connected to said handle; a calking cartridge carried in said barrel, said cartridge including a nozzle at one end, said nozzle having an inlet end and an outlet end extending beyond the end of said

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barrel opposite said one end, and a diaphragm normally closing said inlet end, and a spring between said handle and said trigger for urging it away from said handle, said spring including an elongated leg having a pointed, terminal end portion disposed out of engagement with said trigger, said leg being formed so that it is freely insertable through said nozzle, and said leg having a length exceeding the length of said nozzle between said inlet and outlet ends so that said diaphragm can be punctured by inserting said pointed terminal end through said nozzle.

2. The apparatus as claimed in claim 1 wherein said spring leg terminates adjacent the free end of said trigger, and wherein said trigger is of U-shaped cross-sectional configuration in a plane transverse to its axis, said trigger having a width at its free end exceeding the diameter of said nozzle at its outlet end so that said spring leg is freely insertable into and through said nozzle.

3. A calking apparatus comprising a gun including a semicylindrical barrel, an inlet cap secured to one end of said barrel, an outlet cap secured to the opposite end of said barrel, a calking cartridge tube positioned in said barrel, a piston mounted in the end of said tube adjacent said inlet cap, an end cap connected to the opposite end of said tube, an elongated nozzle carried by said end cap, said nozzle having an inlet end and an outlet end projecting through said outlet cap, a diaphragm normally closing said inlet end of said nozzle, plunger means carried by said gun for contacting said piston to express calk from said tube through said nozzle, a handle connected to said inlet cap, a trigger pivotally mounted on said handle for actuating said plunger means, and a spring mounted between said handle and said trigger for urging said trigger away from said handle, said spring including a leg in engagement with said handle and an opposed leg in engagement with said trigger, said opposed leg having a pointed terminal end portion bent away from said trigger, and said opposed leg having a length exceeding the distance between the outlet end of said nozzle and said diaphragm so that said diaphragm can be punctured by inserting the pointed terminal end portion of said opposed spring leg through said outlet end of said nozzle.

4. The apparatus as claimed in claim 3 wherein said trigger is of U-shaped cross-sectional configuration in a plane transverse to its axis, said trigger having a width at its free end exceeding the diameter of said nozzle at its outlet end so that said opposed spring leg is freely insertable into said nozzle.

5. A calking apparatus comprising a gun including a barrel, a handle connected to one end of said barrel, and a trigger pivotally mounted on said handle, a calking cartridge mounted in said barrel, said cartridge including a nozzle having an inlet end and an outlet end extending beyond the end of said barrel opposite said one end, and a diaphragm normally closing said inlet end; and a spring carried between said handle and said trigger for urging it away from said handle, said spring including an elongated leg exceeding the length of said nozzle between said inlet and outlet ends so that said diaphragm can be punctured by inserting said leg through said nozzle, said leg having a substantially flat distal end portion terminating at a point, and a laterally projecting barb spaced from said point.

6. In a calking apparatus including a gun having a barrel, a handle at one end of the barrel, a trigger, a trigger spring having an elongated leg, and a cartridge having a nozzle with inlet and outlet ends and a sealing diaphragm enclosing the inlet end, the steps of inserting the terminal end of the spring leg into the outlet end of the nozzle, camming the spring leg away from the trigger, and passing the spring through the nozzle thereby to puncture the diaphragm at the inlet end.

7. In an assembly of a calking gun including a barrel, a handle at one end of the barrel, a pivotally mounted trigger, a spring having an elongated leg engaging the

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trigger, and a calking cartridge, said cartridge including a nozzle having inlet and outlet ends and a diaphragm sealing inlet end, the steps of forming a point on the terminal end portion of the elongated spring leg, spacing the terminal end portion of the spring leg from the trigger so that the terminal end can be inserted into the outlet end of the nozzle, shaping the spring leg including the terminal end portion so that it can be passed through the nozzle, placing the terminal end portion into the outlet end of the nozzle, and camming the spring leg away from the trigger while moving the leg through the nozzle until the diaphragm has been punctured.

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