Oct. 2, 1951 A. E. GASDIA 2,570,055

PIERCING DEVICE

Filed March 29, 1948

Fig. 1.

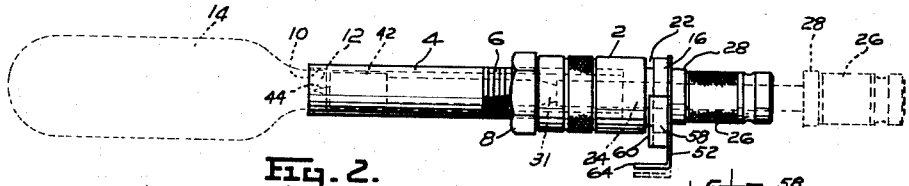


Fig. 2.

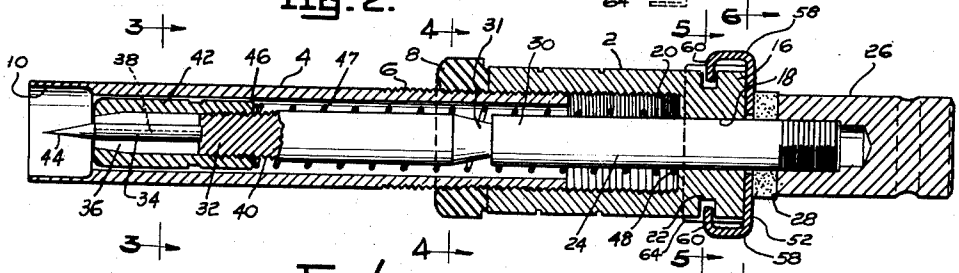


Fig. 3.

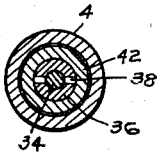


Fig. 4.

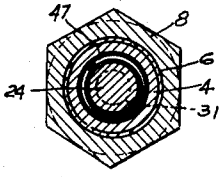


Fig. 5.

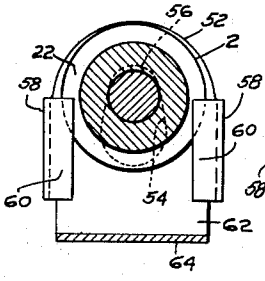


Fig. 6.

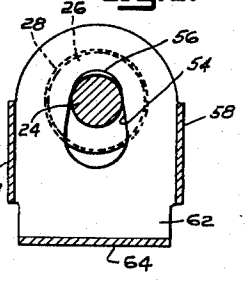


Fig. 8.

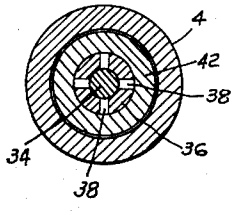


Fig. 9.

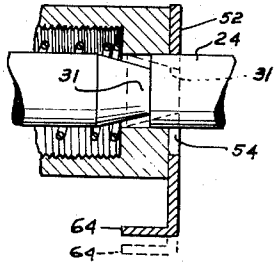
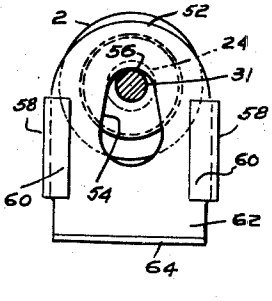


Fig. 7.



INVENTOR.

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PIERCING DEVICE

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Application March 29, 1948, Serial No. 17,599

4 Claims. (Cl. 164—123.5)

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My invention relates to piercing devices and more particularly to apparatus which is especially adapted for puncturing the seal of a high pressure container filled with air or gas, such as (CO_2) carbon dioxide, used in jet propelled units.

Accordingly an object of my invention is to provide a specially constructed piercing device or apparatus, having a suitably arranged piercing means slidably mounted in a holder or centralizing tube, also, having a suitable trigger means associated therewith for releasing said piercing means with sufficient force, so that the capping seal in said air or gas container may be punctured.

Another object of my invention is to provide said device with a suitable resilient means which is mounted upon a plunger or rod, adapted for restricting and for eliminating the jar caused by the sudden stop of said piercing means and when released from the cocked place and into its normally extended or rest position.

A further object of my invention is to provide said piercing means with a plunger or rod, having the frontwardly extending end provided with a removable stylus and arranged so that the same may be removed and exchanged for new when worn out or required.

Another object of my invention is to provide said device with a suitable front tube or barrel, said barrel having an adjustable means associated therewith adapted for decreasing or increasing the piercing position of said stylus, and thereby increasing or decreasing the opening or hole in said capping seal of said air or gas container.

My invention also has for its objects to provide such means that are positive in operation, convient in use, easily installed in a working position and easily disconnected therefrom, economical in manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description.

However, the drawings merely show and the following description merely describes the embodiments of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views; wherein,

Fig. 1 is a horizontal elevational view of the piercing device, shown in relation to a gas or air container, shown in dotted lines.

Fig. 2 is an enlarged horizontal sectional view thereof.

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Fig. 3 is a vertical sectional view of the device, taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view, taken on the line 4—4 of Fig. 2.

Fig. 5 is a vertical sectional view, taken on the line 5—5 of Fig. 2.

Fig. 6 is another vertical sectional view, taken on the line 6—6 of Fig. 2.

Fig. 7 shows a vertical sectional view, similar in position as shown in Fig. 6, showing the plunger rod in locked position.

Fig. 8 is a vertical sectional view, similar in position as shown in Fig. 3, said view being slightly enlarged and showing the collet in modified form.

Fig. 9 shows a vertical fragmentary and sectional view of the device, showing the locking conical groove on a plunger rod in relation to a tripper plate.

Describing my invention more in detail, in its broader aspects, said invention comprises a housing 2, having a threaded front end in which a barrel 4 is adjustably mounted and held in place by means of a threaded end section 6, and also having a suitable locking nut member 8 provided therein for locking said barrel 4 in position.

Said barrel 4 is tubular in structure, and is provided with a stabilizing front end bore 10 adapted for receiving therein the neck member 12 of a gas or air container 14, shown in dotted lines.

The rear end 16 of said housing 2 is provided with a center guide 18, which terminates at the center recess 20. Also, said housing 2, at the outer surface is provided with a suitable groove 22, the purpose of which will be presently described.

In said guide 18 a plunger rod member 24 is slidably mounted, of which the rear end thereof is provided with a suitable knob 26 suitably secured thereon. Also, in front of said knob a resilient collar member 28 is provided, as shown.

The outer surface of said housing 2 including said knob 26 is knurled, for facilitating the handling thereof.

In the mid-section 30 of said plunger rod 24 a conical groove 31 is provided, while at the front end section 32 a stylus member 34 is mounted within a collet bushing 36, having a longitudinal slot 38 for providing tight fit of said stylus when in position. Plunger rod 24 also has suitably threaded section 40 adapted for fastening a collet nut 42 over said bushing 36 and for holding said stylus member 34 in position.

Said stylus member 34 is provided with an elongated piercing point 44, which extends front-

wardly from said bushing **36** and through said collet nut **42**, as shown.

It may then be noted that said stylus member **34** may be removed and exchanged for new, when required or when said piercing point **44** becomes worn out or dull.

Rearwardly of the base **46** of said collet nut **42** a suitable compression spring **47** is mounted, which extends rearwardly and over said plunger rod member **24**, the one end of which bears against said collet nut base **46** while the other end **48** bears against said center recess **20** of said housing **2**.

Between the rear end **16** of said housing **2** and said resilient collar member **28** a suitable tripping plate member **52** is mounted, having an elongated hole **54** for receiving said plunger rod member **24**, the lower end of which is slightly larger as shown in Figs. 5, 6 and 7, for eliminating binding, while the upper hole end **56** is slightly smaller for providing a greater surface contact when dropped in said conical groove **31** of said plunger rod member **24**.

In order to prevent said tripping plate member **52** from tilting facewardly, a pair of outward guards **58** are provided, which extend sidewardly, each having an inwardly bent guide extension **60** which extends into and rests within said groove **22** of said housing **2**. Also, the downwardly extending section **62** of said tripping plate member **52** is provided with a ledge **64**, which is adapted for facilitating the tripping operation of said plunger rod member **24**, when set in its cocked position.

In operation, said plunger rod member **24** is pulled rearwardly, see Fig. 1, as shown in dotted lines, allowing said conical groove **31** to come beneath said elongated hole **54**, and allowing the weight of said tripping plate member **52** to cause said upper hole end **56** to rest over and within said conical groove **31**, and also causing said compression spring **47** to become compressed.

Said spring **47**, when in compressed position, provides the driving force for said stylus member **34**.

When said stabilizing front end bore **10** is placed over the neck member **12** of a gas or air container **14**, as shown in Fig. 1, while said stylus member **34** is held in its cocked position, and when said tripping plate member **52** is moved into a disengaged position and out of said conical groove **31**, then said spring **47** in expanding lengthwise, will cause said piercing point **44** to penetrate into and through the capping seal disposed in said neck member **12** of said container **14**, and causing the gas or air sealed therein to be released therefrom.

The position of said stabilizing front end bore **10** may be adjusted frontwardly or rearwardly, and may be locked in a set position by means of said locking nut member **8**, thereby allowing said piercing point **44** of said stylus member **34** to penetrate the capping seal to a degree desired, which may be a small or large hole, as the case might be.

Said resilient collar member **28** prevents and eliminates the jar, caused by the sudden stop and arresting movement of said plunger rod **24**, carrying said piercing point **44** when said knob **26** comes to rest against said rear end **16** of said housing **2**, and when said plunger rod is released and driven frontwardly by said compression spring **47**, thereby facilitating the handling of said device and the operation thereof.

As shown in Fig. 8 said collet bushing **36** is provided with several slots **38**, each being longitudinal in structure as shown in Fig. 2, and thereby providing a greater binding effect upon said stylus member **34** when in position. Also, as shown in Fig. 9, said tripping plate member **52** may be made without side guides and be equally effective when in use and operation, however, the preferred embodiment of my invention of said tripping plate member is shown in Figs. 1 to 7 inclusive.

While I have thus described my invention with great particularity, it will be clear that the same may be modified throughout a wide range.

I, accordingly, do not propose to be limited to the exact details of construction herein shown on the drawings and described in the specification, but reserve the rights in practice to make the necessary changes and modifications therein, which may come within the scope of the appended claims.

I claim as my invention:

1. In a piercing device of the class described comprising, a housing, a barrel member detachably and adjustably mounted in said housing, a locking nut associated with said barrel member for holding and for maintaining said barrel member in an adjusted position to said housing, a plunger rod member slidably mounted in said housing and extending into said barrel member, a knob at the rear end of said plunger rod member, a collet means at the front end of said plunger rod member, a stylus means removably mounted in said collet means, and a compression spring mounted on the plunger rod and engaging said housing for driving said plunger rod means including said stylus means frontwardly from its rearwardly cocked position.

2. In a piercing device of the class described, as disclosed in claim 1, wherein a resilient collar is provided between said housing and said knob, for preventing and for reducing the jar caused by the frontward movement of said plunger rod member into its normally resting position.

3. In a piercing device of the class described, as disclosed in claim 1, wherein a tripper plate is provided between said housing and said knob, a conical groove means in said plunger rod member for engaging said tripper plate and thereby holding said plunger rod member in cocked position.

4. In a piercing device of the class described, as disclosed in claim 3, wherein said housing is provided with groove means disposed at the rear end thereof, and guide extensions in said tripper plate for guiding the same into locked position when said plunger rod member is extended rearwardly, thereby preventing said tripper plate from tilting when said device is in operative position, substantially as described.

ALFRED E. GASDIA.

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The following references are of record in the file of this patent:

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