M. H. ROBERTS.

EXPLOSIVE CARTRIDGE.

APPLICATION FILED NOV. 13, 1918.

1,298,097.

Patented Mar. 25, 1919.

Fig. 1,

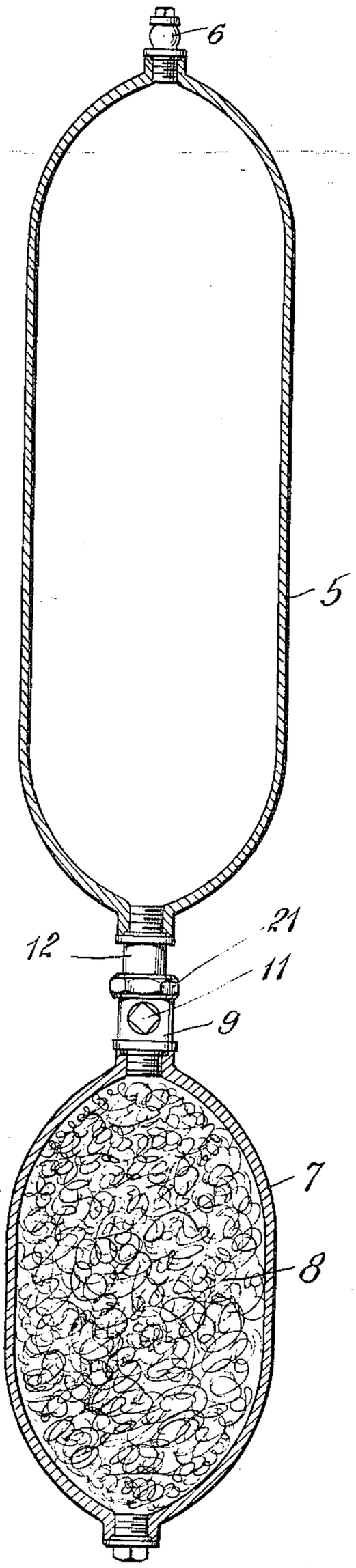


Fig. 2,

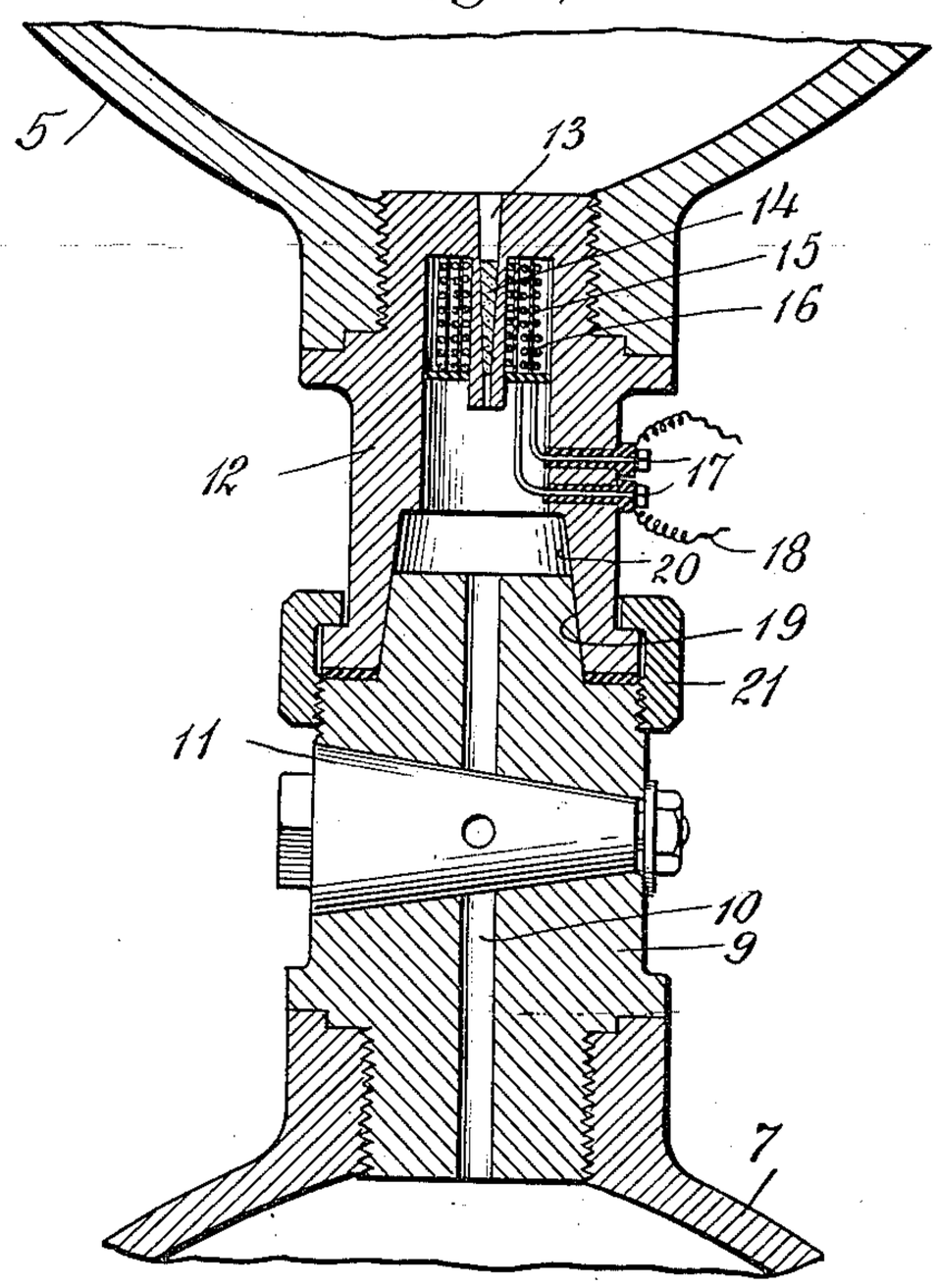
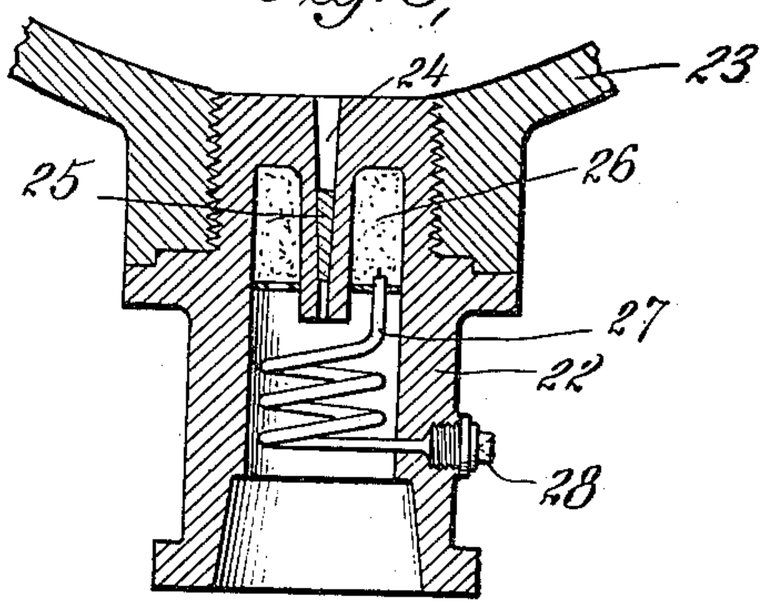


Fig. 3,



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UNITED STATES PATENT OFFICE.

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EXPLOSIVE CARTRIDGE.

1,298,097. Specification of Letters Patent. **Patented Mar. 25, 1919.**

Application filed November 13, 1918. Serial No. 262,270.

To all whom it may concern:

Be it known that I, MONTAGUE H. ROBERTS, a citizen of the United States, residing at Jersey City, in the county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Explosive Cartridges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its purpose the provision of a safe and relatively inexpensive explosive adapted to be manufactured and stored in quantity, without danger of spontaneous explosion through deterioration or otherwise.

A further object of my invention is the provision of an explosive in which the combustible and combustion supporting ingredients are preserved in separate containers and are not mingled until the moment when explosion is desired.

Further objects and advantages of my invention will be apparent, as it is better understood, by reference to the following specification, when read in connection with the accompanying drawing illustrating a preferred embodiment thereof, in which—

Figure 1 is a longitudinal section illustrating one form in which my invention may be embodied;

Fig. 2 is an enlarged sectional view through the connection between the separate containers for the combustible and combustion supporting ingredients; and

Fig. 3 is an enlarged sectional view similar to Fig. 2, but illustrating a slightly different form of my invention.

The fundamental theory, upon which the explosive art depends, requires the intimate commingling of combustible and combustion supporting materials in such form that combustion, when initiated, occurs rapidly to produce large quantities of gaseous combustion products. The commingling of the ingredients introduces a constant danger of spontaneous ignition and premature explosion which has been the cause of numerous accidents. Spontaneous ignition is a frequent result of deterioration of the product, and can only be guarded against by, either using or destroying the material, before the expiration of the predetermined period.

According to my invention, the combustible and oxidizing ingredients are maintained in separate containers and are not commingled until the moment of explosion. The containers for the combustible and oxidizing ingredients may even be stored in separate places and may be brought together only when the explosive is desired for immediate use. Thus, all danger of spontaneous explosion is eliminated. Furthermore, the ingredients of my explosive are relatively inexpensive, being common commercial commodities readily procured in the open market. Expensive plants, subject to explosion hazards, are not required for its production, and the safety of persons employed in its manufacture is assured.

In the drawing, I have illustrated a simple embodiment of my invention, and it is to be understood that the containers shown may be varied widely in form, taking the shape, for example, of a torpedo, mine, bomb, blasting charge or, in fact, any form adapted to the utilization of the product as an explosive. Furthermore, the means, controlling the commingling of the ingredients, may be of a character best adapted to the particular form of containers employed, it being understood that the drawing is intended to illustrate merely a practical means permitting the commercial use of my invention.

In the drawing, 5 indicates a shell adapted to contain a supply of an oxidizing gas, preferably oxygen, under a relatively high pressure preferably in the neighborhood of three thousand pounds per square inch, one end of the shell being provided with an inlet valve 6, through which the charge of oxygen is admitted. A similar, but smaller, shell 7 is adapted to contain a supply of combustible material, such as oil, either mineral or vegetable, preferably disseminated through a porous mass 8 which may be carbon, kieselguhr, cotton-waste or, in fact, any material adapted to support the oil in the form of a film or separate particles and in condition to permit the oxidizing gas to contact therewith, when the gas is admitted to the cylinder 7.

An inlet 9 is supported in one head of the

cylinder 7, and is provided with a passage 10 which is preferably normally closed by a valve 11, which may be operated manually, or otherwise, to open the passage. An outlet 12, secured to the head of the cylinder 5, is provided with a passage 13, normally closed by a plug 14 of fusible metal. The passage 13 is surrounded by a chamber 15 in which a coil 16 of a suitable electric resistance element is disposed, the coil being connected to suitable terminals 17 on the exterior of the outlet 12, which may be in turn connected by conductors 18 to any suitable source of current.

The inlet 9 to the cylinder 7 is provided with a tapered neck 19, closely fitting a tapered socket 20 in the outlet 12 from the cylinder 5, to provide a gas-tight joint when the inlet 9 and outlet 12 are connected by the threaded coupling 21.

From the foregoing, it will be readily understood that the cylinders 5 and 7 may be separately charged, the former with oxygen at a pressure of upward to three thousand pounds per square inch, and the latter with combustible material, as described, and the two cylinders may be placed into communicating relation, when desired, and secured by the coupling 21. When thus assembled, there is no possibility of commingling of the respective charges, while the valve 11 remains in closed position and the plug 14 is intact. When the valve 11 is open and a supply of current is permitted to flow through the coil 16, the temperature of the fusible plug 14 will be raised to substantially its melting point, when the oxygen will escape and pass through the passage 10 to the combustible material. The contact of oxygen, under high pressures, with oil, results in spontaneous and instantaneous combustion with the formation of large quantities of combustion products which immediately rupture both containers, with a resulting explosion which may be made to serve any useful or desirable purpose.

In Fig. 3, the outlet 22 from the oxygen cylinder 23 is provided with a tapered passage 24, closed by a plug 25 of fusible metal. The plug 25 is surrounded by a chamber containing combustible material 26 capable of generating a temperature sufficient to melt the fusible plug 25. The material 26 may be a slow-burning powder or, in fact, any of a number of substances well known and adapted to the purpose. A fuse 27 is connected to the material 26 and to a nipple 28 adapted to receive a cap, or other device, whereby the fuse is ignited. Obviously, the fuse may be ignited in a variety of ways, as may best suit the convenience of the user, and the purpose for which the explosive is to be used.

It will be readily understood that I have perfected an explosive adapted to a wide variety of uses and capable of manufacture and handling, without danger to the manufacturer or user. The structure required is extremely simple and inexpensive, and the materials required are not only inexpensive, but may be obtained from readily available sources and in large quantity.

While the preferred embodiment of the invention has been shown, it will be understood that various changes in the construction may be made, without departing from the principle of the invention.

I claim:

1. An explosive cartridge comprising combustible and combustion supporting materials including a gaseous medium under pressure separately contained and normally prevented from commingling, and controllable means for permitting commingling of said materials.

2. An explosive cartridge comprising combustible and combustion supporting materials, separate closed shells inclosing said materials and controllable means for permitting commingling of said materials.

3. An explosive cartridge comprising two separate closed containers, a supply of oxygen under pressure in one of said containers, a combustible material in the other container, and means controlling the passage of the oxygen to the latter container.

4. An explosive cartridge comprising two separate containers, a supply of oxygen under pressure in one of said containers, an oil saturated porous material in the other container and means controlling the passage of the oxygen to the latter container.

5. An explosive cartridge comprising two separate containers, a supply of oxygen under pressure in one of said containers, a quantity of oil in the other container and means controlling the passage of oxygen to the latter container.

6. An explosive cartridge comprising two separate containers, a supply of combustible material in one of said containers, a supply of oxidizing gas under pressure in the other container, a normally closed passage connecting said containers, and means for controlling said passage.

7. An explosive cartridge comprising two separate containers, a supply of combustible material in one of said containers, a supply of oxidizing gas under pressure in the other container, an inlet to and an outlet from the respective containers, means for assembling said containers with said inlet and outlet in communicating relation, and means for releasing said gas from the container therefor.

8. An explosive cartridge comprising two separate containers, a supply of combustible material in one of said containers, a supply of oxidizing gas under pressure in the other container, means for assembling said containers with a communicating passage there

between, and means for releasing said gas from the container therefor.

9. An explosive cartridge comprising two separate containers, a supply of combustible material in one of said containers, a supply of oxidizing gas under pressure in the other container, means for assembling said containers with a communicating passage therebetween, and means for releasing said gas from the container therefor and a valve for controlling said passage independently of said last mentioned means.

10. An explosive cartridge comprising separate closed containers for combustible material and oxygen under pressure, a communicating passage between said containers, means normally closing said passage and means for controlling the closing means.

In testimony whereof I affix my signature.

MONTAGUE H. ROBERTS.