Oct. 16, 1962 J. C. O'BRIEN 3,058,419

BLASTING ASSEMBLY

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Fig. 1.

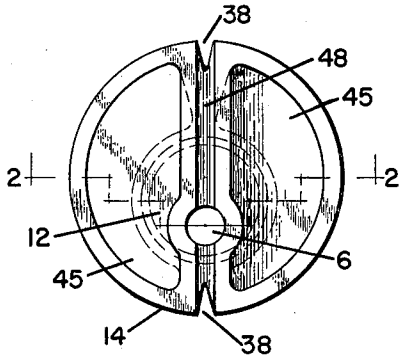
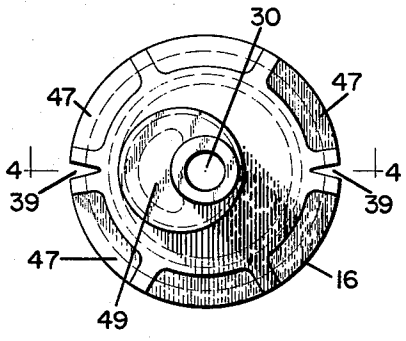


Fig. 3.



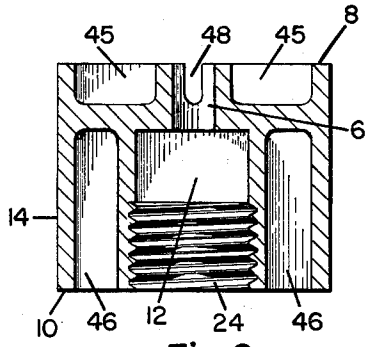


Fig. 2.

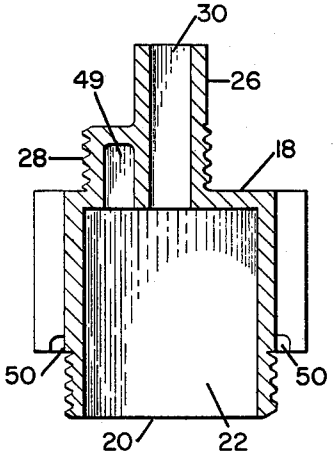


Fig. 4.

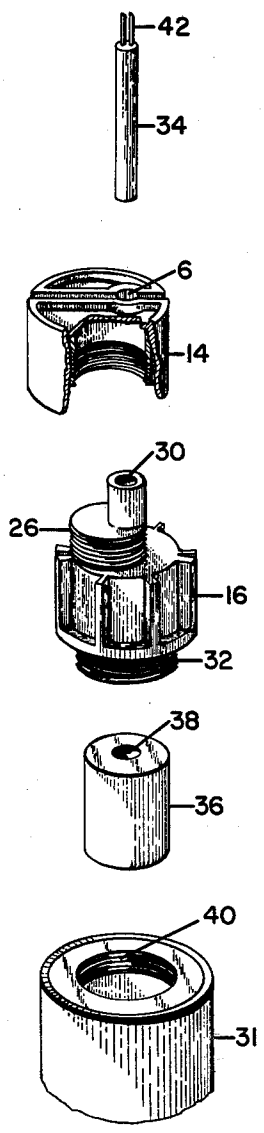
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Fig. 5.



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BLASTING ASSEMBLY

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5 Claims. (Cl. 102—24)

This invention relates to explosive cartridge assemblies of the kind which find particular application in the field of geophysical prospecting.

More particularly this invention relates to a blasting assembly device to be used in combination with canned explosives in seismograph prospecting for oil.

It is an object of the present invention to provide an explosive cartridge assembly with reliable initiation and especially adapted to seismic blasting operations.

Another object of the invention is to provide a blasting assembly which will reliably detonate a base charge column under high hydrostatic heads.

A still further object of the present invention is to provide a blasting assembly unit which combines the function of primer and detonator shield.

These and other objects and advantages will become apparent from the following description and arrangement of the parts and from the accompanying drawings wherein like numerals refer to like parts.

This invention is embodied in an explosive assembly adapted for connection to a column of explosives. The assembly is divided transversely into two housing elements, the first housing element including a first detonator well and the second housing element including a second detonator well, and a booster well with means for putting into registry the first and second detonator wells and such that when the two housing elements are completely connected, the detonator wells are out of registry.

One specific embodiment of the invention is illustrated in the drawings, in which:

FIGURE 1 is a top plan view of the first housing element.

FIGURE 2 is a sectional elevation of the first housing element taken along line 2—2 of FIGURE 1.

FIGURE 3 is a top plan view of the second housing element.

FIGURE 4 is a sectional elevation of the second housing element taken along line 4—4 of FIGURE 3.

FIGURE 5 is an exploded view of the assembly along with a detonator, a booster, and the top portion of a canned explosive.

As shown in FIGURES 1 and 2 the first housing element **14** is a cylindrical piece including an eccentrically arranged and generally cylindrical first detonator well **6**, the axial centerline of which is parallel with the axial centerline of element **14**. Detonator well **6** extends from an exterior face **8** of the element through a meeting face **10**. In addition, first housing element **14** includes a concentrically arranged cavity **12** the axial centerline of which is also parallel to the axial centerline of first housing element **14**. Cavity **12** extends from the meeting face **10** partly through housing element **14** and communicates with detonator well **6** which extends from cavity **12** through to the exterior face **8** of the housing element **14**.

As shown in FIGURES 3 and 4, second housing element **16** is a cylindrical piece including a concentric booster well **22** adapted to receive a booster charge and extending from exterior face **20** of the housing element **16** and partly through the housing element. Second housing element **16** also includes an eccentrically arranged and generally cylindrical plug member **26** extending outwardly from a meeting face **18** of the second housing element **16**, plug member **26** being of such diameter that it fits into cylindrical cavity **12** of first housing element **14**. In the specific embodiment shown the cylindrical cavity **12** of the first housing element **14** is provided with threads **24** adapted to be engaged with threads **28** which are provided on the plug member **26** of the second housing element **16**.

The generally cylindrical plug member **26** of the second housing element **16** is also provided with a concentric second detonator well **30** extending through plug member **26** to booster well **22**. The axial centerline of detonator well **30** of the second housing element **16** is concentric with the axial centerline of the second housing element **16**.

It is now apparent that first housing element **14** may be operatively secured to the second housing element **16** to provide a blasting assembly which houses both the detonator and the booster elements of an explosive train thereby permitting association of a detonator with a booster. In addition, first detonator well **6** of first housing element **14** may be placed in registry with second detonator well **30** of the second housing element **16** in one angular relationship of housing element **14** and housing element **16** only. When the threads **24** and **28** are completely engaged so that meeting face **10** of the housing element **14** is in contact with the meeting face **18** of the second housing element **16**, the two housing elements **14** and **16** are coaxially aligned, but first detonating well **6** of first housing element **14** is out of registry with second detonator well **30** of second housing element **16**.

As shown in FIGURES 4 and 5, the second housing element is provided with threaded portion adjacent its external face **20** which permits the blasting assembly to be attached to the threaded portion **40** of a canned explosive unit **31** containing, for example, nitro-carbo nitrate or other base explosive charge. A series of similar explosive units may be secured together as provided in the Lewis Patent 2,238,939 to form a rigid column of explosive cartridges which may easily be inserted into a shot hole. The assembly of this invention may be applied to the end unit.

From the exploded view of drawing, FIGURE 5, it can be seen how the instant device permits the association of detonator **34**, booster element **36** and base explosive charge **31** into an effective explosive column.

In assembling the column, booster element **36** which may be a shell containing a high explosive, such as, for example, pentaerythritol tetranitrate, is placed in booster well **22** of the second housing element **16** after which second housing element **16** is threadedly attached to the top can **31** of the explosive column by means of threads **32** on element **16** and threaded well **40** of the base can explosive charge **31**. First housing element **14** is then threadedly attached to second housing element **16** by means of threads **28** on plug member **26** and the threads **24** of eccentric cavity **12** in housing element **14**. Prior to complete engagement of threads **24** and **28** and at a position where first detonator well **6** is in registry with second detonator well **30** detonator element **34** is inserted all the way through first detonator well **6** of the first housing element **14** and into second detonator well **30** of the second housing element **16**. It will be noted that the booster element contains a concentric bore **37** which is adapted to receive the lower portion of detonator element **34**.

After insertion of the detonator as hereinabove described, the threads **24** and **28** are completely engaged so that the meeting face **10** of housing element **14** is in contact with meeting face **18** of second housing element **16** and first detonator well **6** is out of registry with second detonator well **30** and detonator **34** is locked into position in association with booster **36**.

In the preferred embodiment it can be seen that registry of detonator well **6** of the first housing element **14** and the second detonator well **30** of the second housing element **16** is provided by eccentrically mounted screw connections provided on plug member **26** of the second housing element **16** and the threaded cavity **12** of the first housing element **14**, however, bayonette or other plug means may be employed for association the two housing elements **14** and **16**.

It will also be noted that the blasting assembly device of the present invention is also provided with a plurality of grooved portions, **38** and **39** which are provided to permit passage of the detonator leg wires **42** about the housing elements. First housing element **14** is provided with a groove **48** across its exterior face and in addition longitudinal grooves **38** on either side of the housing element which grooves communicate with the horizontal groove **48** and provide for a substantially continuous grooved passage about the housing element. In addition second housing element **16** is provided with longitudinal grooves **39** on opposite sides of the element which grooves communicate with the longitudinal grooves **38** of the first housing element **14** when the two housing elements are completely associated and the meeting face **10** of housing element **14** is in contact with meeting face **18** of second housing element **16**. In addition, second housing element **16** is provided with a substantially circular channel **50** as shown in FIGURE 4 at is exterior face and immediately above the threads **32** on element **16**.

Thus, it will be seen that in assembling the explosive column utilizing the blasting assembly of the present invention that leg wires **42** of detonator **34** may be passed out through the first detonator well **6** horizontally across the exterior face of housing element **14** in the horizontal groove **48** down one side of housing element **14** in the longitudinal groove **38** and into the longitudinal groove **39** of the second housing element. The wires are then pressed about the exterior into channel **50** and from there up the other side of the housing elements in longitudinal grooves **39** and **38**. In this manner it can be seen that there is no pull exerted on the detonator **34** or the leg wires **42** and the wires may be used to lower or raise the blasting assembly into a drill hole. In addition, the groove elements as provided remove the wires from the area directly in line with the blasting column and thus tamping rods can be utilized in ramming the entire assembly into a drill hole without damaging the detonator wires.

As shown in FIGURES 2 and 3, the housing elements **14** and **16** are also provided with cut-away portions **45**, **46**, and **47** which have been provided in order to lighten the assembly and provide for greater ease of fabrication. The blasting assembly of the present invention may be advantageously composed of any suitable plastic rigid material such as polystyrene and it has been found that the provided cut-away portions lighten the unit and provide for better casting.

The invention has been described in the foregoing. However, variations in the blasting assembly may be provided without departing from the present invention.

I claim:

1. In a device of the character described, an assembly divided transversely into a first housing element and a second housing element, each of said housing elements having a meeting face and an exterior face, said first housing element including a first detonator well, said second housing element including a second detonator well and a booster well, said second detonator well extending through the meeting face of said second housing element to said booster well, each of said housing elements having a mutually cooperating threaded portion thereon providing a screw connecting means for engagedly connecting said housing elements and permitting said first detonator well in said first housing element to be placed into and out of registry with said second detonator well in said second housing element, said screw connecting means on said housing elements positioned eccentric to the axial center lines of both said first and said second housing elements.

2. In a device of the character described, an assembly divided transversely into a first housing element and a second housing element, each of said housing elements having a meeting face and an exterior face, said first housing element including first detonator well positioned eccentric to the axial center line of said first housing element said second housing element including a second detonator well and a booster well said second detonator well and said booster well located concentric to the axial center line of said second housing element, said second detonator well extending through the meeting face of said second housing element, each of said housing elements having a threaded portion thereon providing a screw connecting means for associating said first and said second housing elements and for placing said first detonator well in said first housing element into and out of registry with said second detonator well.

3. An assembly as in claim 2 wherein said screw connecting means for associating said first and said second housing elements are eccentric to both housing elements.

4. In a device of the character described, an assembly divided transversely into a first housing element and a second housing element, each of said housing elements having a meeting face and an exterior face; said first housing element including a generally cylindrical cavity extending from the meeting face of said first housing element and partly through said element, said cavity eccentrically arranged in relation to the axial center line of said first housing element, the axial center line of said cavity being parallel to the axial center line of said first housing element, a generally cylindical detonator well extending from said cavity to the exterior face of said first housing element, said detonator well being eccentrically arranged in relation to the axial center line of said first housing element, the axial center line of said detonator well being parallel to the axial center lines of both said cavity and said first housing element but coincident with neither, said second housing element having a booster well positioned concentric to the axial center line of said second housing element and extending from the exterior face thereof into said element, a generally cylindrical plug member eccentrically arranged in relation to the axial center line of said second housing element extending outwardly from the meeting face of said second housing element, said plug member being of a diameter such that it fits into said cylindrical cavity in said first element, the axial center line of said plug member being parallel to the axial center line of said second housing element, said plug member further including a generally cylindrical detonator well eccentrically arranged in relation to the axial center line of said plug member, said detonator well having an axial center line coincident with the axial center line of said second housing element and said booster well, said plug member fitting into said cavity of said first housing element so as to permit the meeting faces of said elements to engage and the center lines of said elements to conincide and also so as to permit rotation of said elements with respect to each other whereby said detonator wells may be put into registry under a condition in which the axial center lines of said members are not coincident.

5. An explosive assembly device comprised of a first housing element and a second housing element, said first housing element having a detonator well, said second housing element having a detonator well and a booster well in communication therewith, each of said housing elements having a threaded portion thereon providing a mutually cooperating screw connecting means,

said housing elements adapted to be engagedly connected together by said screw connecting means upon rotation of one housing element in respect to the other housing element, said detonator wells in said housings being placed into and out of registry during connection of the housing elements, and the said detonator wells being positioned out of registry when said housing elements are completely connected.

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