Oct. 28, 1958 O. F. LAGEMANN 2,857,844

EXPLOSIVE ASSEMBLY

Filed March 15, 1956

FIG.1.

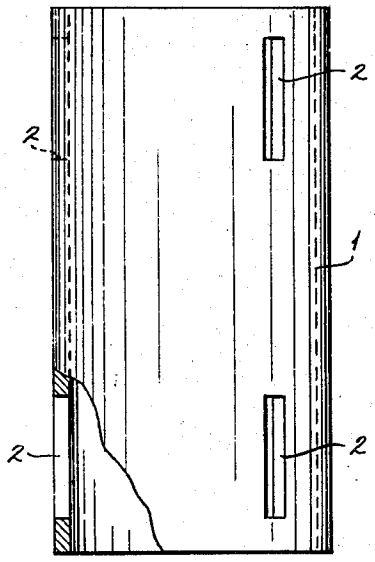


FIG.2.

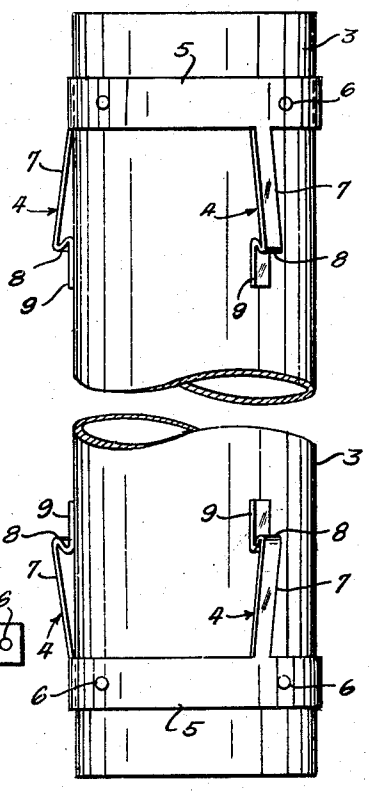


FIG.3.

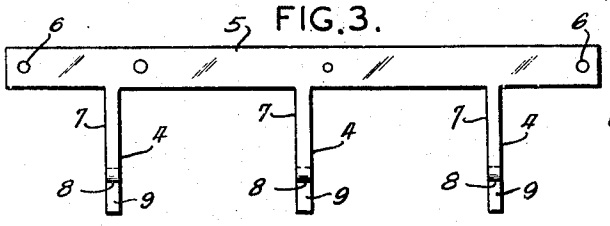


FIG.4.

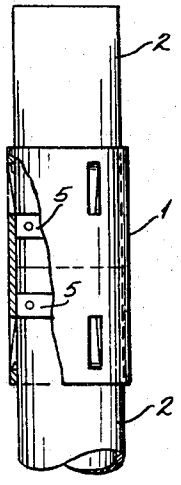
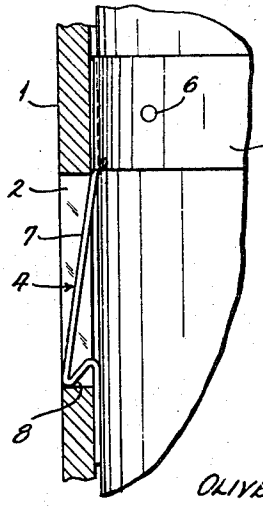


FIG.5.



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EXPLOSIVE ASSEMBLY

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3 Claims. (Cl. 102—24)

This invention relates generally to an explosive cartridge assembly and more particularly to a novel means for connecting a series of cartridges in end to end abutting relationship.

A plurality of explosive cartridges are attached in end to end propagating relationship before they are placed in a bore hole for use in seismic explorations. Ordinarily, in practice, the manufacturer of the cartridge also furnishes the sleeve and the two are shipped together with each cartridge having a sleeve thereon. In assembling a plurality of cartridges together one sleeve must be removed because in each assembly the number of sleeves required is one less than the number of cartridges. Various types of sleeves having teeth-like projections which bite into the wall of the cartridge have been proposed for this purpose. Sleeves having the teeth-like projections are very difficult to remove and the cartridge is damaged in the process. A further disadvantage inherent in the prior art devices is that the connecting means is sometimes not strong enough to support long columns of cartridges and the cartridge thus sometimes becomes separated as the column is lowered into the bore hole.

It is, therefore, an object of this invention to provide an explosive assembly devoid of the foregoing disadvantages. Another object of the invention is to provide an explosive cartridge and a connecting sleeve having a snap lock which secures the sleeve to the cartridge. Still another object of the invention is to provide an explosive cartridge and connecting sleeve combination which can be conveniently shipped together and can be separated from each other without damage to the cartridge. A still further object of the invention is to provide a connecting means adapted to support the weight of a relatively long column of blasting cartridges and having a sleeve adapted to be removed easily from the blasting cartridge.

Other objects will become apparent from the following description with reference to the accompanying drawing in which:

Figure 1 is an elevational view, partially in section, of an embodiment of the sleeve member provided by this invention;

Figure 2 is a fragmentary elevation of an explosive cartridge adapted to cooperate with the sleeve of Figure 1 to provide an embodiment of the explosive cartridge assembly of this invention;

Figure 3 is an elevation of one embodiment of the male portion of the locking means of this invention;

Figure 4 is an elevation, partially in section, showing explosive cartridges held in end to end abutting relationship by means of this invention; and

Figure 5 is a fragmentary section showing in detail one embodiment of the sleeve and cartridge arrangement when locked together.

The foregoing objects as well as others are achived in accordance with this invention by providing an explosive cartridge having a resilient tab attached thereto and a sleeve fitting around the cartridge having a slot therein; the resilient tab being adapted to spring into the slot and lock the sleeve to the cartridge. The connecting sleeve is provided with a slot and forms a slidable fit over the cartridge. The cartridge has one or more tabs attached thereto and projecting therefrom at an acute angle. A reverse bend is formed in the tab with the end opposite that attached to the cartridge bent into a plane substantially parallel with the wall of the cartridge and lying thereagainst thus imparting resiliency to the tab. Ordinarily, three equally spaced tabs are provided, and, in a preferred embodiment of the invention, the three tabs are integral with the band adapted to encircle the cartridge and to be secured thereto. Three tabs will support the weight of long columns of several hundred pounds of explosive, but the number of tabs may be varied depending upon the number and weight of explosive cartridges to be joined. One tab is enough for some purposes. The tabs are fastened to the cartridge near the end thereof and slots are provided near each end of the connecting sleeve and properly located to mesh or register with the tabs on the dynamite cartridge and to cooperate therewith to secure the sleeve to the cartridge.

In order better to describe and further clarify the invention the following is a detailed description of one embodiment thereof:

A spirally wound kraft paper sleeve **1** having a wall about one-fourth inch in thickness and having a plurality of slots **2** located adjacent each end thereof is illustrated in Figure 1. A dynamite cartridge **3** having tabs **4** attached thereto through integral band **5** by means of rivets **6** is illustrated in Figure 2. Tab **4** projects outwardly from the cartridge at an acute angle. The tab is divided into a latching portion **7**, reverse bend **8** and back-up member **9** lying against the wall of the cartridge. The back-up member **9** cooperates with reverse bend **8** to lend resiliency to the tab. The dynamite cartridge **2** is provided with tabs near each end thereof.

A preferred embodiment of the tab member is illustrated in detail in Figure 3. This tab may be a metal stamping and is composed of band **5** having three tabs **4** integral therewith. Holes **6** are provided in the band to facilitate the attaching of the tabs to the dynamite cartridge by means of a rivet. In assembling two cartridges together with the locking means provided by this invention, one cartridge is inserted in the sleeve **1** until tab **4** registers with a slot **2**. The resilient tab **4** then springs into the slot and locks the sleeve to the cartridge. In practice it is preferred to use three equally spaced tabs with three properly spaced slots. The resulting assembly is illustrated in Figure 4 where the two cartridges are shown in end to end abutting relationship. The tabs must be placed on the cartridge with the back-up members **9** facing each other, as shown in Figure 2.

The relative position of spring **4** and slot **2** is illustrated in detail in Figure 5. Preferably, the dimensions of the reverse bend are such that the latching portion **7** of tab **4** extends through the slot only to the outer edge of the sleeve. Although the tabs illustrated in the drawing are connected to the cartridge through band **6**, it is not necessary to use the band and each tab may be individually riveted or otherwise secured to the cartridge. Moreover, the band may be secured to the cartridge by securing its two ends together and then securing a paper band to the cartridge on each side of the metal band.

The tab **4** must be made from a material such as metal which has sufficient ductility to be resilient. Copper-zinc alloys, spring steel, aluminum and other similar metals may be used. Although it is preferred to make the sleeve

from paper because it is very economical, it is, of course, possible to make the sleeve from metal, plastic or other suitable material. The locking arrangement provided by this invention is suitable for connecting various types of explosive cartridges in end to end abutting relationship. It is most frequently used, however, for joining dynamite cartridges in propagating relationship for use in seismic explorations.

In packing cartridges and sleeves having the locking arrangement provided by this invention for shipment, the sleeve is pushed down over the cartridge without a slot registering with the tabs. This compresses snap-lock 4 tightly against the wall of the cartridge. Since the sleeve is ordinarily not more than about one-half the length of the cartridge, the cartridges can be packed in a box much smaller than the box required to package dynamite cartridges in which the sleeve must be positioned in the end of the cartridge. When it is desired to use the sleeve to assemble two cartridges together, it is moved toward the end of the cartridge until a slot registers with the tab. The tab then springs into the slot into the position shown in Figure 5 and locks the sleeve to the cartridge. If it is desired to remove the sleeve from the cartridge, a suitable implement may be pushed against latching member 7 compressing the reverse bend 8 until the tab rests against the cartridge and no longer protrudes into the slot of the sleeve. As indicated hereinbefore, in practice, each cartridge is provided with a sleeve by the manufacturer. Not all of the sleeves will be used in connecting the cartridges together, but, inasmuch as the sleeve length can be less than the cartridge length, it is not necessary to remove any of the surplus sleeves from the cartridges, because they can be positioned near the center of the cartridge without interfering with those sleeves used to connect the cartridge. The sleeve length can be varied but in most instances it need not be more than about one-half the length of the cartridge. For example, a sleeve about twelve inches long may be used for connecting a cartridge two feet long and containing from about 5 to about 10 pounds of explosive.

Although the invention has been described in considerable detail in the foregoing, it is to be understood that such detail is solely for the purpose of illustration and that many modifications can be made by those skilled in the art without departing from the spirit and scope of the invention except as it may be limited by the appended claims.

I claim:

1. A cylindrical explosive cartridge having near one end thereof a snap-lock and in combination therewith a coupling sleeve fitted around the cartridge and having a slot therein which cooperates with the snap-lock to secure the sleeve to the cartridge, said snap-lock comprising a band around the cartridge and secured thereto, a tab projecting from said band and extending longitudinally away from the said end of the cartridge, said tab having a latching portion, an S curve and a back-up portion, said latching portion being adjacent said band and projecting outwardly from the wall of the cartridge at an acute angle toward the longitudinal center thereof and terminating at said S curve which in turn terminates at said back-up member, said back-up member lying against the wall of the cartridge and cooperating with the S curve to impart resiliency to the tab and to urge said latching portion outwardly from the wall of the cartridge into the slot in the sleeve.

2. A cylindrical blasting cartridge having a snap-lock attached to the wall thereof near one end of the cartridge and in combination therewith a coupling sleeve fitting around the cartridge and having a slot therein adapted to cooperate with said snap-lock and secure the sleeve to the cartridge, said snap-lock being a tab comprising a latching portion, an S curve and a back-up portion, said latching portion having one end thereof secured to the cartridge and projecting outwardly therefrom at an acute angle with the wall of the cartridge toward the longitudinal center thereof, a portion of the tab at the opposite end lying adjacent the cartridge wall forming said back-up portion and an S curve between the back-up portion and the latching portion, said latching portion being positioned between the back-up portion and the said end of the cartridge, said back-up portion and S curve cooperating together to impart resiliency to the tab.

3. A cylindrical explosive column comprising a plurality of explosive cartridges in end to end abutting relationship, the adjacent cartridges in said column being secured against relative movement by means of a sleeve having slots therein which cooperate with a snap-lock attached to each of the cartridges, said snap-lock having a tab comprising a latching portion secured to the wall of the cartridge near one end thereof and projecting outwardly from the wall of the cartridge at an acute angle therewith toward the longitudinal center thereof, a portion of the tab at the opposite end lying against the wall of the cartridge and forming a back-up member, said latching portion being positioned between the back-up portion and the said end of the cartridge, and between said back-up member and said latching portion an S curve cooperating with said back-up member to lend resiliency to the tab and form a snap-lock.

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