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F. W. OLIN ET AL

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DETONATOR PACKAGE

Filed Jan. 12, 1933

Fig. 1.

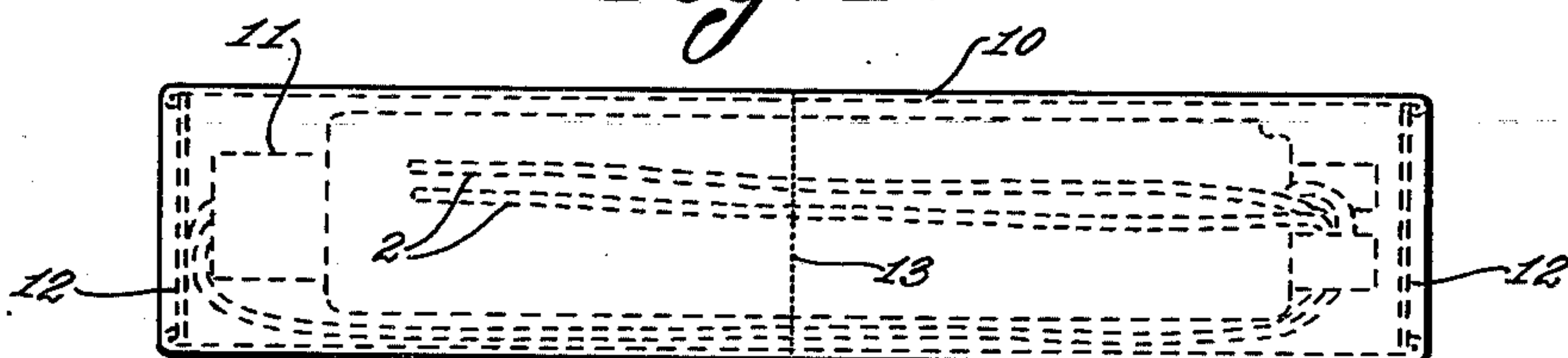


Fig. 2.

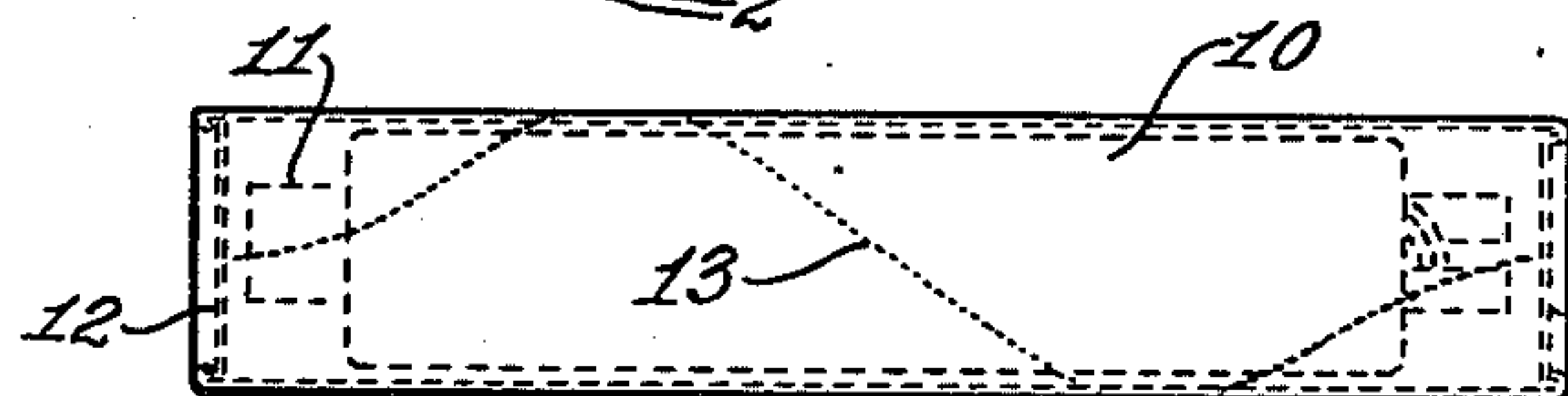
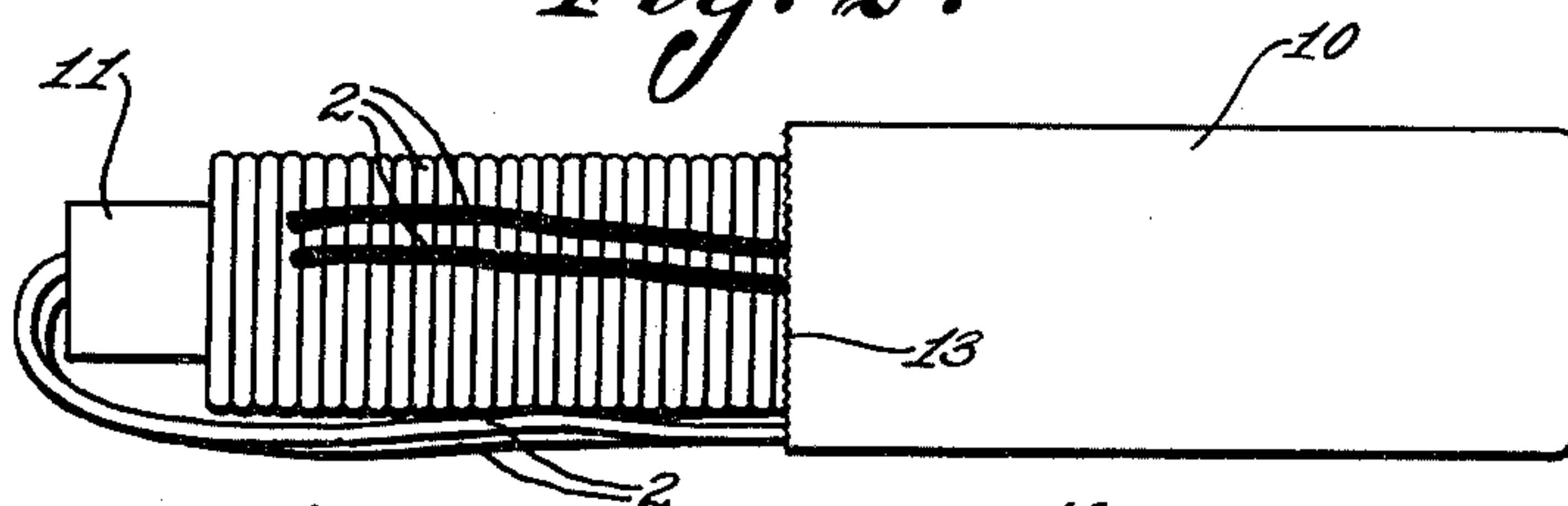


Fig. 9.

Fig. 3.

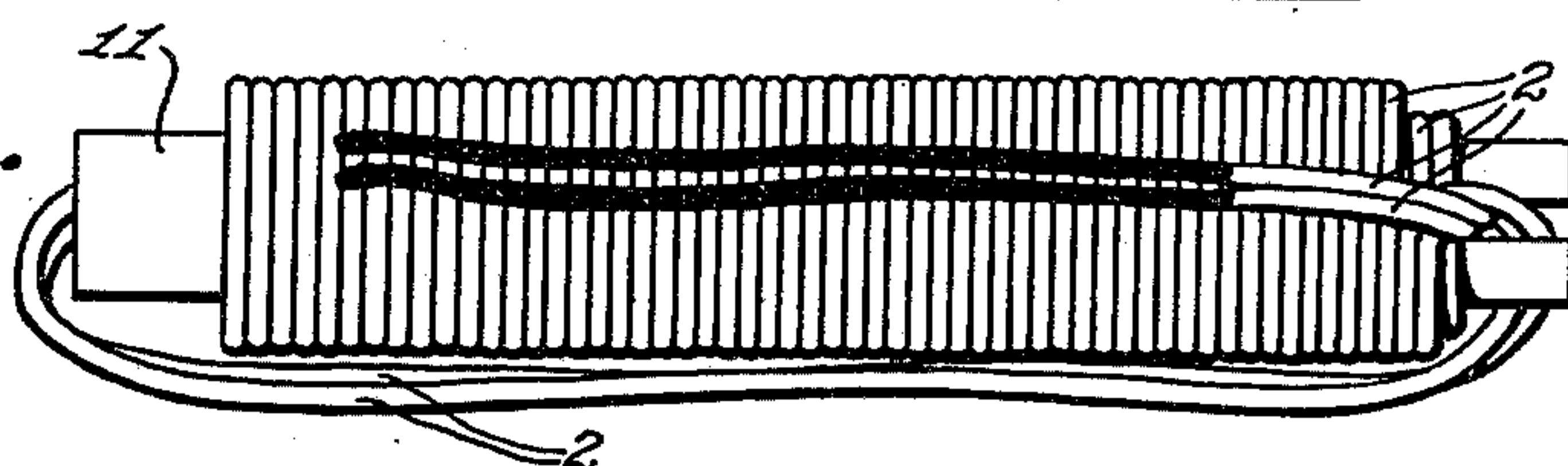


Fig. 6.

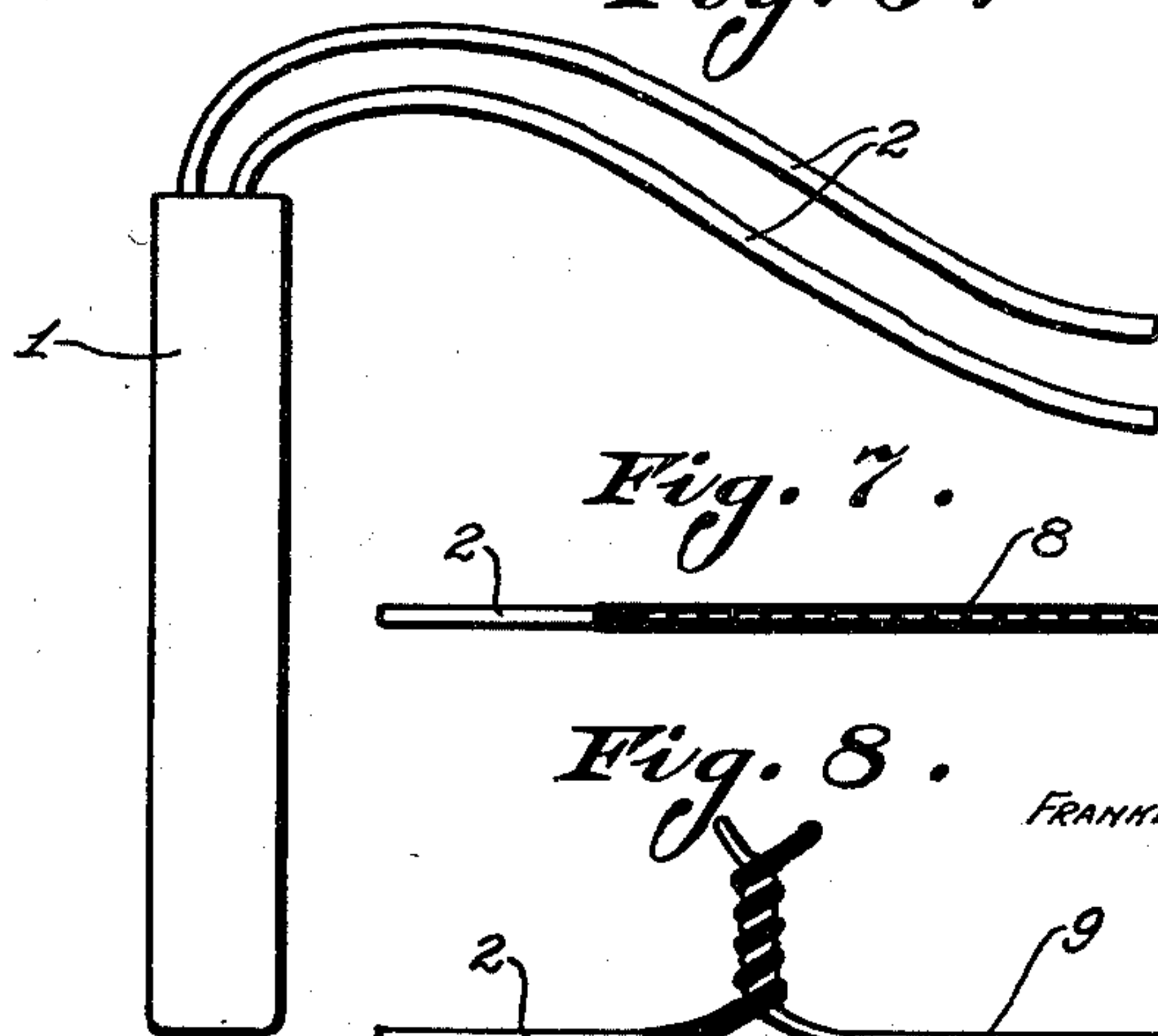


Fig. 7.



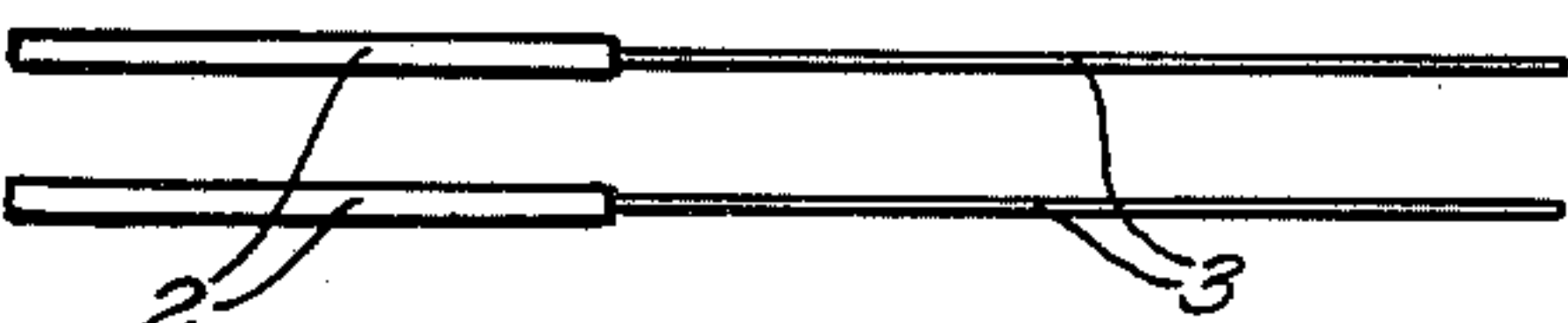
Fig. 8.



Fig. 4.



Fig. 5.



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UNITED STATES PATENT OFFICE

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DETONATOR PACKAGE

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6 Claims. (Cl. 102—10)

This invention pertains to packages, and more particularly to packages adapted to contain dangerous articles such as detonators used in blasting operations.

5 Such a detonator usually comprises a small cylindrical container filled with an explosive charge and an electrical igniting device. One or more leads are brought out from the igniting device, usually to a considerable length so as to provide for connecting the detonator to a suitable firing circuit. As such a detonator is somewhat unwieldy on account of the long leads attached thereto and as it is easily exploded, by even a slight current applied to the leads, it is important to provide a package for shipping or handling such that the entire device is protected against accidental ignition.

One of the objects of this invention, therefore, is to provide a package adapted to protect the detonator and its leads and to insulate the latter against accidental contact with any circuit liable to cause ignition.

Another object is to provide such a package wherein the free ends of the leads are effectively insulated against accidental contact by an insulating covering which is easily removable or frangible so that contact with a firing circuit may be effected without difficulty.

Another important feature in a package for a dangerous article of this kind is to insure against a package, which has been dropped accidentally or left lying about, getting into a pile of refuse or other situation in which danger of accidental explosion is imminent. Another object of this invention, therefore, is to provide a case for a package of this kind, such that when it is broken to extract the detonator, becomes deformed in such a manner or separated into parts of such size and shape that the opened package is readily distinguishable from the complete package. This insures that the parts of a broken package are readily recognizable as distinguished from a complete package. Accordingly an unbroken package will at once be recognized when found out of place and will be picked up and restored to a safe place.

Another object is to provide such a case for a package of this type that is so arranged that the easiest way of opening it is to break it in such a way as to be readily distinguishable from the complete package.

Other objects will appear from the following description taken in connection with the accompanying drawing in which,

65 Figure 1 is a side view of a complete package

embodying this invention with the interior parts indicated in dotted lines;

Figure 2 is a similar view shown with one part of the casing removed;

Figure 3 is a similar view with the casing entirely removed;

Figures 4 and 5 are detail views illustrating one method of insulating the free ends of the leads;

Figure 6 is a detail view of the detonator and its leads;

Figure 7 is a detail of the free end of a lead showing the tip insulating coating;

Figure 8 is a detail view illustrating the connection of the free end of the lead to the firing circuit; and

Figure 9 is a view similar to Figure 1 but showing another embodiment of this invention.

Referring now to the drawing, 1 indicates a detonator, which usually consists of a small copper cylinder containing a charge of explosive and an ignition device. Connected to the ignition device are leads or conductors 2 which are brought out of the detonator 1 and which extend a sufficient distance to provide for reaching from the blasting point to a firing circuit. The ends of the leads may be stripped of insulation as indicated at 3 in Figure 6.

In order to protect the ends 3 against accidental contact, they may be provided with an insulating covering which should be easily removable. In Figure 4, the end is covered with a sheath or covering 4 which may be either a separate sleeve passed over the stripped end, or it may be the original insulation of the wire which is cut through at 5 so as to separate it for easy removal. In order to secure this portion against accidental removal, a wad of wax or other frangible material 6 may be placed over the cut 5 so as to secure the insulating covering 4. The tip end of the sheath may also be sealed by a wad 7 of wax or the like.

In the arrangement of Figure 7, the stripped end of the lead is provided with a dipped coating 8. By a dipped coating as used in this specification and the appended claims is meant a coating such as may be formed by dipping the wire into a fluid bath of the insulating compound so that upon removal the compound adheres to the wire to a substantial thickness. The coating 8 may be applied by dipping or otherwise, and the compound is one which adheres to the wire but which is permanently soft enough to be cut through by twisting two wires together. By a soft coating as used in this specification and the appended claims, is meant a coating which is

soft or plastic and easily frangible as distinguished from a coating which becomes too hard, stiff and tough to be cut through by twisting the wires together.

- 5 Insulating compounds of wax are ordinarily suitable for this purpose. A compound which is suitable is made up of the following:

	Parts
Carnauba wax-----	5
10 Shellac-----	5
Gum elemi, soft-----	3

15 Other wax compounds which provide a permanently soft coating may also be used. When the lead is coated with such a compound, it may be connected with a conductor 9 of a firing circuit by simply twisting the two wires together as shown in Figure 8. The nature of the insulating compound is such that this operation cuts or
20 breaks the compound from the lead 2 so that contact with the conductor 9 is made.

In accordance with this invention, a casing 10 is provided to completely cover and enclose the detonator. In order to prepare the same for
25 packing, the detonator 1 is inserted in a tube 11 of cardboard or other suitable material and the leads 2 are then wound around the tube in a coil so as to cover the tube and to form a small cylindrical package. The covered ends of the
30 leads are laid along the coil as shown in Figures 2 and 3. The complete coil is then slipped into the casing 10 from one end, the other end being closed by a cap 12 crimped or otherwise secured to the casing 10. When the detonator has been
35 inserted another cap 12 is similarly secured to the other end of the casing so that the entire package is closed and sealed.

The casing 10 may be constructed of paper, cardboard or the like and is provided at a point
40 intermediate its ends with a scored line 13. This may be made by indenting the casing in a line therearound so as to weaken it at this point. It may also be made by a line of perforations extending around the casing and covered by a sheet
45 of paper such as the outside label. In either case this portion of the casing is weakened so that the same is easily broken at this point. Since the casing is more easily opened by breaking it at the line 13, than by removing one of the caps 12, the natural method of opening the casing will
50 be by breaking it at 13.

This separates the casing into sections, each of which is half the size of the original casing as shown in the illustration. Other forms or proportions than half size may, of course, be used,
55 by placing the line 13 in an appropriate manner on the casing. In any case, this arrangement is such that the resultant form or parts of the casing when open are each of them of such a size or shape as to be readily distinguishable
60 from the complete casing. Accordingly if these parts are left lying about after use, anyone can tell at a glance whether a part is a complete casing or a broken section. In accordance with another embodiment of this invention, the line 13,
65 instead of extending circularly around the package, may extend spirally for a part of, or even several convolutions as shown in Figure 9, and by twisting, the casing is broken at the scored or weakened line so as to not only open the casing to permit removal of the detonator, but also to distinguish the opened or ruptured package. Anyone who sees a casing of full length or one
70 unruptured will know at once that it is a complete package and is dangerous and will take the

proper steps to see that it is rendered safe. This feature of the invention, therefore, provides an additional safety measure to insure against accidental loss or misplacement of a complete detonator package, and consequent accidental injury to persons. 5

It will be seen that this invention provides a detonator package having a number of advantages. The complete package includes a detonator with its leads formed into a small handy
10 package. The ends of the leads are provided with insulation which insures against contact with any source of current. The insulation on these leads is permanently soft or frangible so that it is easily removed or broken in order to
15 make contact with the firing circuit. On the other hand when in the complete package, this insulating coating is protected by the casing 10 against danger of accidental contact or abrasion of the coating. Accordingly the device is perfectly safe so long as the casing 10 is intact. When the detonator is to be used, the casing is easily broken and the ends of the leads are insulated sufficiently to prevent accidental contact between the time that the package is broken
20 and the time at which actual connection to the firing circuit is made. The discarded sections of the casing 10 may be found lying about and by their dimensions anyone can tell immediately that they are broken sections and harmless. 25

While this invention has been described as a unitary device forming a single package, it will be understood that individual features or sub-combinations thereof may be useful in themselves without reference to the other features. It is to be understood, therefore, that the use of such individual features or sub-combinations is contemplated by this invention and within the scope of the appended claims. 30

It is further obvious that various changes may be made in the details of construction within the scope of the appended claims without departing from the spirit of this invention; it is understood, therefore, that the invention is not to be limited to the specific details shown and/or described. 35

Having thus described the invention, what is claimed is:

1. A detonator package, comprising, a detonator, a lead therefor wound into a coil, and a dipped insulating coating on the free end of said lead of material that is permanently soft. 40

2. A detonator package, comprising, a detonator, a lead therefor wound into a coil, and a dipped insulating coating on the free end of said lead of a wax compound that is permanently soft enough to be cut through by twisting two leads together. 45

3. A detonator package, comprising, a detonator, a lead therefor wound into a coil, and a dipped insulating coating on the free end of said lead of a compound of carnauba wax that is permanently soft enough to be cut through by twisting two leads together. 50

4. A detonator package, comprising, a detonator, a lead therefor wound into a coil, and a dipped insulating coating on the free end of said lead of a compound of carnauba wax, gum elemi, and shellac. 55

5. A prepared package comprising a detonator, and an elongated casing for said detonator having end walls and integral side walls, the casing side walls being weakened along a definite line intermediate the ends to facilitate rupture thereof to permit the detonator to be taken out of the casing and to leave the empty package of 60

a different appearance readily distinguishable from a filled package.

- 5 6. A prepared package comprising a detonator cartridge having current conducting wire, and an elongated casing for the cartridge and wire having end walls and integral side walls, the casing side walls being weakened along a definite line intermediate the ends to facilitate rupture

thereof to permit the cartridge and wire to be taken out of the casing and to leave the empty package of a different appearance distinguishable from a filled package.

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