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[33] **Germany**
[31] **P 16 78 199.0**

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[54] PROPELLANT CARTRIDGE CARRYING BAND FOR COMMERCIAL DEVICES 8 Claims, 15 Drawing Figs.

[52] U.S. Cl. **102/86.5,
102/34**
[51] Int. Cl. **C06c 7/02,
F42c 19/10, C06d 1/04**
[50] Field of Search. **102/86.5,
39, 34, 345**

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ABSTRACT: A plurality of propellant cartridges are serially connected with each other to form a band that may be rolled up for utilization in a commercial device, such as a riveting gun. The cartridges may be attached to a band by extending their electrical leads through the band for clamping the cartridges to the band, bonding the cartridges to the band, or providing the cartridges with a force fit in recesses of the band, for example. Also, propellant carrying cases may be formed in pairs for serial connection with primer carrying bases formed in pairs. Also, preformed lengths of cartridge-carrying bands may be connected serially with each other by means of connectors.

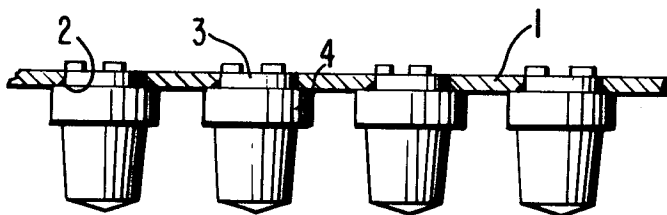


FIG. 1

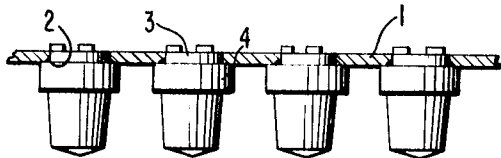


FIG. 2

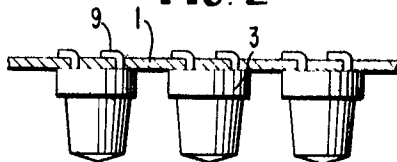


FIG. 1A

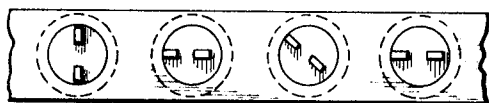


FIG. 2A



FIG. 3

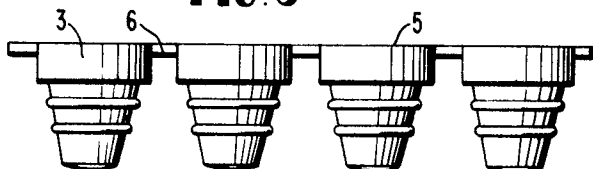


FIG. 4

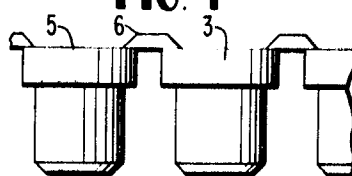


FIG. 3A

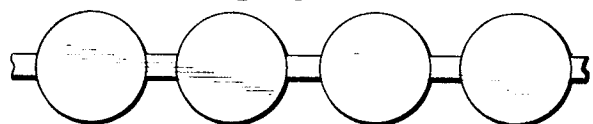


FIG. 4A

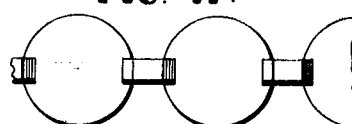


FIG. 6

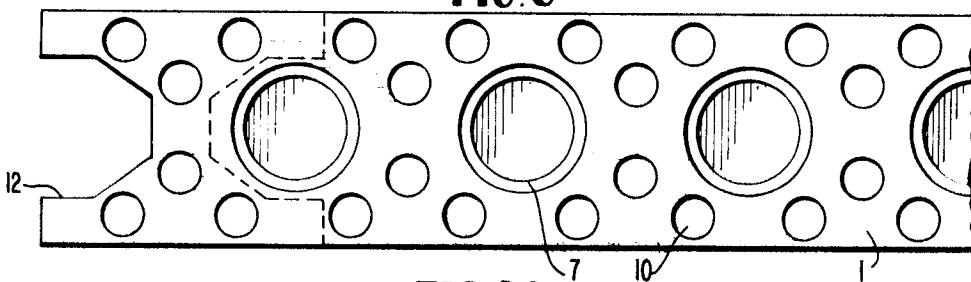


FIG. 6A

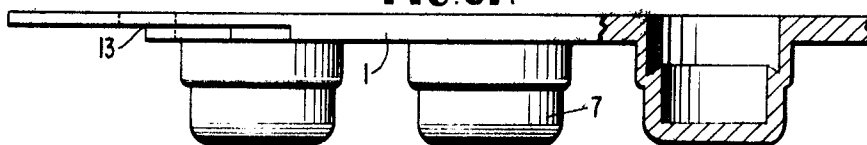
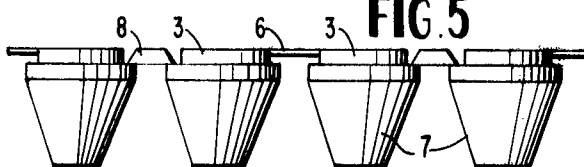


FIG. 5



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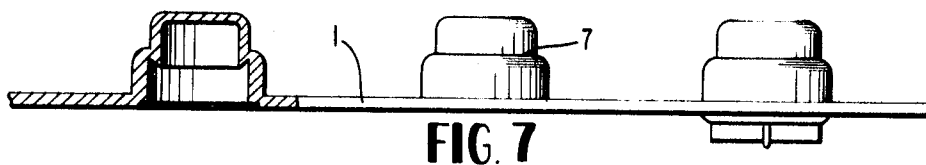


FIG. 7

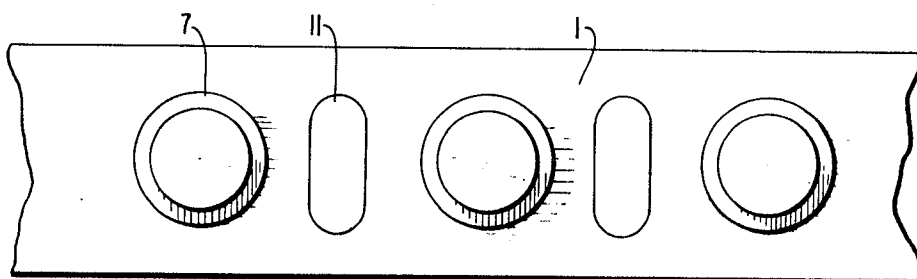


FIG. 7A

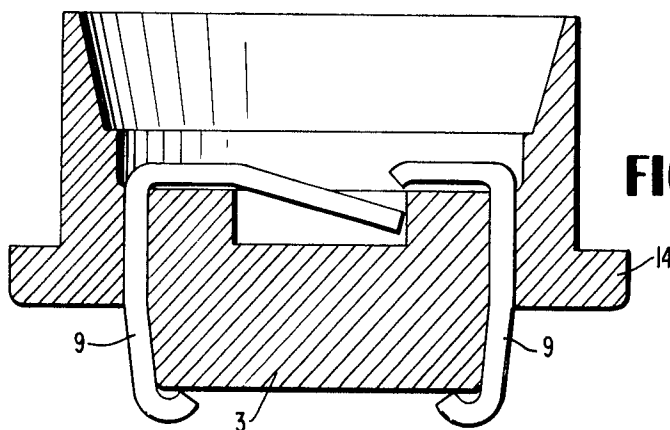


FIG. 8

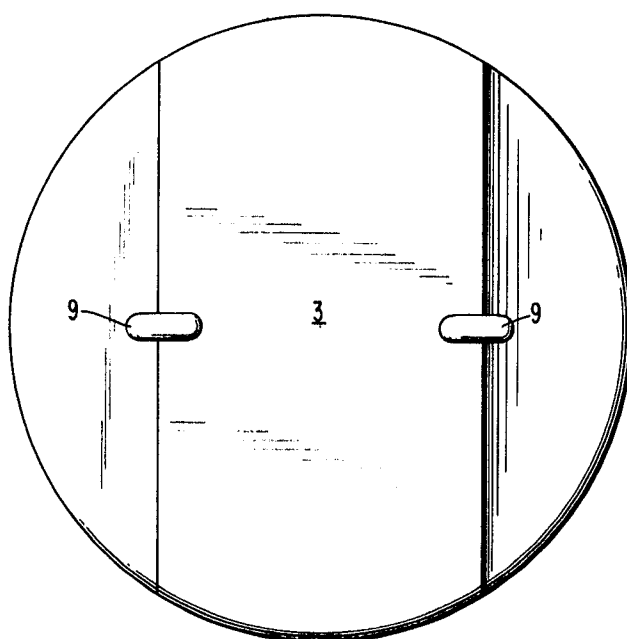


FIG. 8A

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PROPELLANT CARTRIDGE CARRYING BAND FOR COMMERCIAL DEVICES

BACKGROUND OF THE INVENTION

The use of propellant cartridges in commercial devices, such as riveting guns, stud-driving devices, or bolt-driving guns has become quite widespread. These devices have required the removal of the propellant cartridges from containers carrying a large number of cartridges and further require the rather cumbersome manipulation of the relatively small cartridges to place them in the device. In addition to this annoyance, the difficulty of loading has required a large amount of time on the part of the workmen and been responsible for the loss of propellant cartridges, which is particularly dangerous when they are lost on a construction site.

SUMMARY OF THE INVENTION

It is an object of the present invention to avoid the above-mentioned disadvantages with respect to the loading of propellant cartridges in commercial devices by providing a cartridge clip or device containing a plurality of primer cartridges for easy serial use in the firing device. In accordance with the present invention, a flexible flat band or strip is used for carrying a plurality of serially arranged propellant cartridges, which band may be coiled or wound. The band may be constructed of metal, thermoplastic synthetic materials or textile materials.

Particular advantages are gained by constructing the propellant cartridge cases of the same material as the band and to connect the propellant cartridges by bonding, particularly welding, the bases to the band. Although metals are contemplated for this use, thermoplastic synthetic materials have been particularly desirable. A particularly advantageous specific embodiment employs a cartridge case composed of synthetic material and having therein a primer composition insensitive to friction or shock, which is ignited only by means of an electric current.

A particularly advantageous connection between the propellant cartridges and the band is provided by employing a plurality of recesses serially arranged along the length of the band at uniform spacings. The propellant cartridges will have a correspondingly shaped projection for reception in the band recesses, respectively. It is particularly desirable to have the recesses extend all the way through the thickness of the band for a reception of correspondingly dimensioned projections on the propellant cartridges so that the bottom of the propellant cartridge will be flush with the bottom surface of the band.

In addition to the welded or bonded connections between the propellant cartridges and band, it is contemplated that other methods of connection may be employed. Particularly, a propellant cartridge employing an electric primer may be connected by extending the terminal wires from the base through the band and bending them over against the band to thus clamp the propellant cartridge to the band. In addition, a suitable bonding may be provided between the propellant cartridge and the band, particularly by welding the primer base to an unperforated cartridge clip band.

A saving in material can be obtained by forming the primer bases in one piece with connecting webs, which form the band. In addition to saving of material, there is a further advantage of avoiding the step of connecting the propellant cartridges to the band. The same advantages are also obtained by connecting two primer bases with two propellant powder cases by means of a web and then producing a continuous strip from a predetermined number of such components by merely connecting the identical components serially with each other. This has the considerable advantage that from a plurality of identically prefabricated parts, a band of any desired length may be produced in accordance with a particular requirement.

It is also possible to employ propellant cartridge having a case made entirely of metal. This may be accomplished by providing a force fit between the recesses of the band and the

propellant cartridge cases or bases. When employing propellant cartridge cases having a base rim or base fold, the pressing step used to form the rim or fold may be employed to firmly attach the respective propellant cartridge to the band with the rim or fold acting as a flange abutment preventing removal of the propellant cartridge from the band. In this connection, the empty propellant cartridge cases that remain after firing may remain attached to the band and travel with the latter during successive shots. When employing propellant cartridges that do not have a bottom rim or fold, it is possible to form appropriate shoulders or flanges on the propellant cartridge cases so that these shoulders or flanges will retain the propellant cartridges in the band in addition to any clamping or pressing retention.

Considerable advantages are gained by forming the primer cups or bases in one piece with the band or forming the propellant-carrying cases in one piece with the band; this would require that the cases be constructed of the same material as the band. Such a band could be produced in any desired length or cut to any desired length.

A band of any desired length could be formed by welding or otherwise attaching a plurality of shorter bands to form a single strip.

After the propellant powder has been formed in the cases and the primer composition has been formed in the primer bases, the cases and bases may be pressed respectively into each other or joined by any other suitable means.

THE DRAWING

Further objects, features, and advantages of the present invention will become more clear from the following detailed description of the drawing, wherein:

FIGS. 1 and 1a show respectively a side elevation view and a top view of a band employing a plurality of propellant cartridges secured to the band by welding;

FIGS. 2 and 2a show respectively a side elevation view and a top view of a band carrying a plurality of propellant cartridges attached thereto by having the electric lead wires of the electrically ignited primer extending through and clamped on the band;

FIGS. 3 and 3a show a band integrally formed with a plurality of case components, particularly primer bases, connected together by webs formed in one piece therewith;

FIGS. 4 and 4a are side and top views of another embodiment of the embodiment shown in FIGS. 3 and 3a;

FIG. 5 shows another band formed of serially connected component pairs;

FIGS. 6 and 6a are top and side views of a band having propellant powder receiving cups or cases formed in one piece with the band;

FIGS. 7 and 7a are side and top views of another embodiment of the propellant cartridge carrying band of FIGS. 6 and 6a; and

FIGS. 8 and 8a show an embodiment of a primer composition base constructed of synthetic material for an electrically ignitable cartridge to be employed with the band.

DETAILED DESCRIPTION OF THE DRAWING

As shown in FIG. 1, a band 1 carries thereon a plurality of primer receiving bases having their portions 4 provided with a reduced diameter portion received in a correspondingly shaped recess or aperture in the band 1 for securement therewith by means of bonding, particularly ultrasonic welding. The propellant cartridge case is connected to the base 3 by suitable means, which may be of any conventional construction.

The same type of propellant composition carrying case and primer carrying base of FIG. 1 is employed in the embodiment of FIG. 2; except that the connection between the band 1 is different. The connection between the propellant cartridges and the band 1 is provided by the lead wires 9 of the electrically ignitable propellant cartridge, which lead wires extend

through the band 1 and are bent over to clamp the propellant cartridges to the band 1. In addition, a suitable welding or other bonded connection may be provided between the propellant cartridge case portions and the band 1.

As shown in FIGS. 3, 3a, 4, 4a, the cartridge clip may be formed from a plurality of case bases 3 that are connected with each other in one piece by means of integral webs 6 to form a serial chain. The bottom surfaces of the bases may be flush with the webs 6 as shown in FIG. 3 or extend offset as shown in FIG. 4. The shapes of the powder receiving cases in FIGS. 3 and 4 are of no particular significance and are interchangeable with each other or other conventional shapes.

In the embodiment according to FIG. 5, two primer receiving bases 3 are connected in one piece with each other by means of an integral web 6. The bases are respectively telescopically connected with correspondingly formed two propellant powder receiving cases 7, each of which two cases is respectively a component of two adjacent pairs of propellant powder receiving cases. Each pair of propellant powder receiving cases employs two cases connected in one piece with each other by means of a web 8. In this manner, a plurality of propellant powder receiving cases 7 interconnected in pairs by webs 8 are serially connected with a plurality of primer carrying bases 3 interconnected in pairs by means of webs 6. By joining a desired number of pairs in this manner, a single cartridge clip band of propellant cartridges may be obtained with any desired length.

The band 1 of FIGS. 6 and 6a is provided with a plurality of perforations 10, in the same manner that the band 1 of FIG. 7 is provided with a plurality of slots 11, which are arranged at regular intervals along the length of the band. The propellant powder receiving cases 7 are molded integrally in one piece with the band 1 for each of the embodiments of FIGS. 6 and 7. The band of FIG. 6 is provided at one longitudinal end with a recess 12 and an offset shoulder 13, for connection with a complimentary shoulder and recess of another band, which complimentary shoulder and recess would be identical with the shoulder and recess at the other end of the band illustrated in FIGS. 6 and 6a. In this manner, the bands may be connected in a chain of any desired length. The interengaging shoulders 13 and recesses 12 for each connection may be held together by welding or other bonding means.

The bands of FIGS. 6 and 7 having the integral propellant powder receiving cases 7 are to be used in cooperation with the primer composition receiving bases of FIGS. 8 and 8a. After filling the primer base of FIG. 8 with a primer composition and filling the cases 7 of FIGS. 6 and 7 with a suitable propellant powder, the bases are pressed into the cases until the rims or flanges 14 engage the band 1 for a secure connection. The bases 3 are provided with lead-in wires 9 for the electrically ignitable primers. The thus-formed band may be rolled up.

All of the above-described embodiments may employ either metal or a synthetic material and each employs preferably

both a primer composition and a propellant powder composition, the former being preferably electrically ignitable.

It is claimed:

1. A cartridge clip for propellant cartridges to be used in commercial and industrial devices, particularly riveting guns, wherein the improvement comprises a flexible band and a plurality of propellant cartridges serially attached to said flexible band, wherein said band has a surface portion which is at least as wide as the largest diameter of the propellant cartridges, and wherein the band is windable into a roll about an axis which is substantially parallel to said surface portion with the propellant cartridges being disposed substantially perpendicular to the surface portion of the band.

2. The cartridge clip according to claim 1, wherein each of said propellant cartridges includes a base portion constructed of the same material as said band; and including means bonding said base portion to said band.

3. The cartridge clip according to claim 2 wherein said band is provided with a plurality of serially arranged recesses along its length at uniform spacings; said recesses extending through the thickness of said band, each of said base portions having a projection corresponding in length to the thickness of said band so that said base portions may be inserted from one side of the band and bonded flush with the other side of said band.

4. The cartridge clip according to claim 1, wherein said band is provided with a plurality of uniformly serially spaced recesses, and each of said propellant cartridges is force fittingly assembled into respective ones of said recesses.

5. The cartridge clip according to claim 4, wherein each of said propellant cartridges includes a portion having a diameter substantially larger than the associated recess and a projecting portion of substantially the same diameter as the associated recess, with a shoulder portion therebetween; said projecting portion being inserted in said recess so that said shoulder portion engages said band.

6. The cartridge clip according to claim 1, wherein each of said propellant cartridges includes a cup-shaped cartridge case for receiving the propellant powder molded one piece with the band.

7. A cartridge clip for propellant cartridges to be used in commercial and industrial devices, particularly riveting guns, comprising: a flexible flat band having a longitudinal center line extending lengthwise thereof, a plurality of propellant cartridges attached to said flexible band and spaced serially along the longitudinal center line thereof, and wherein said band is windable into a roll about an axis perpendicular to the plane which contains the longitudinal center line in the rolled up condition, said cartridges being disposed substantially perpendicularly to both said longitudinal center line and to the axis about which the band is rolled in the rolled up condition.

8. A cartridge clip according to claim 7, wherein the width of the flat band is greater than the largest diameter of said propellant cartridges.

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