Nov. 9, 1954 D. D. HUYETT 2,693,634

IGNITER JIG FOR ELECTRIC BLASTING INITIATORS

Filed Dec. 5, 1951 2 Sheets-Sheet 1

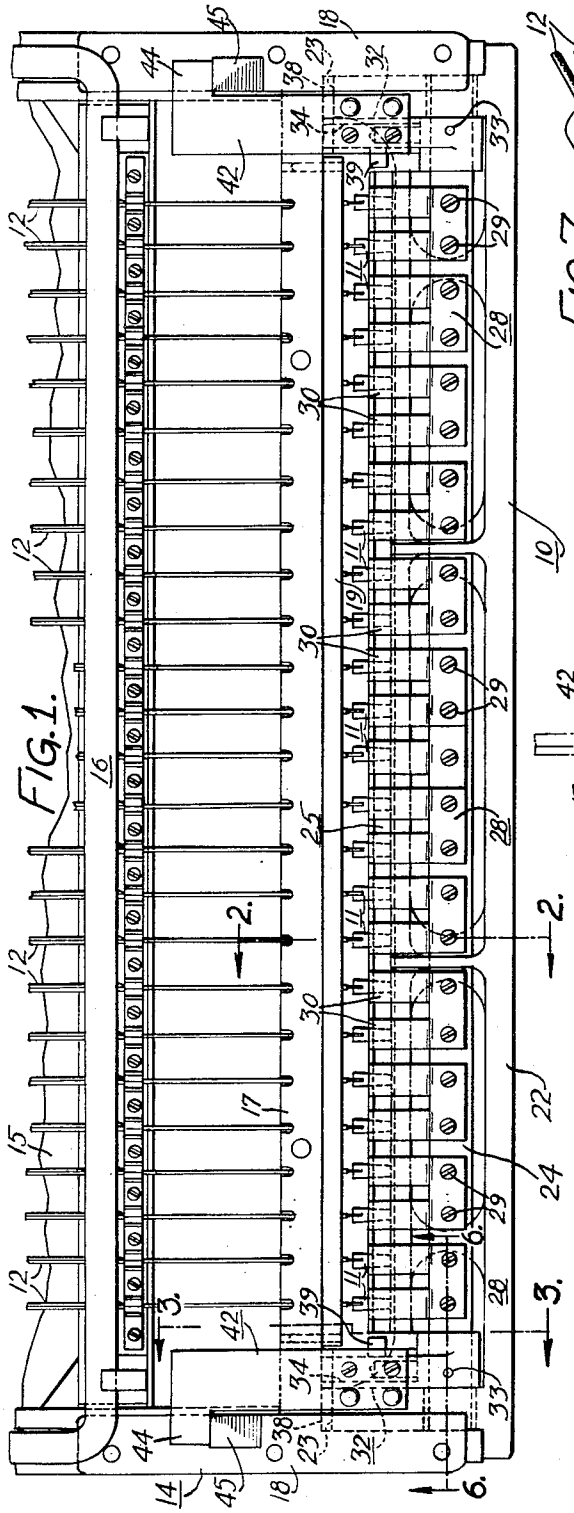


FIG. 1.

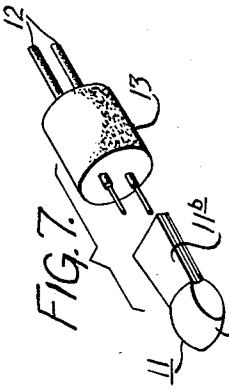


FIG. 7.

FIG. 3.

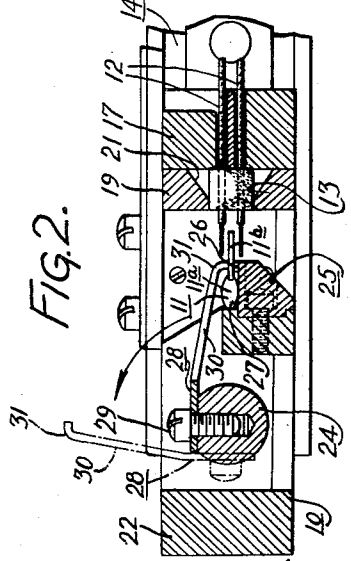


FIG. 2.

Inventor:
Daniel D. Huyett
by his Attorneys
Howson & Howson

Nov. 9, 1954 D. D. HUYETT 2,693,634

IGNITER JIG FOR ELECTRIC BLASTING INITIATORS

Filed Dec. 5, 1951

2 Sheets-Sheet 2

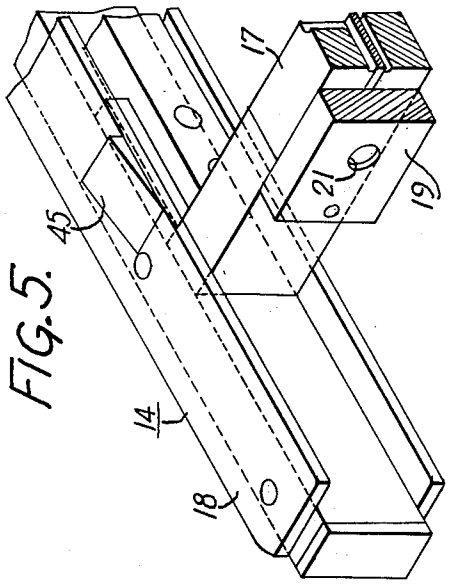


FIG. 5.

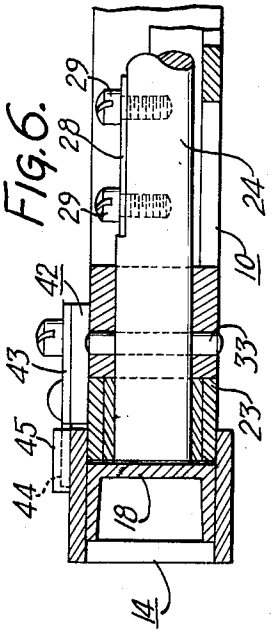


FIG. 6.

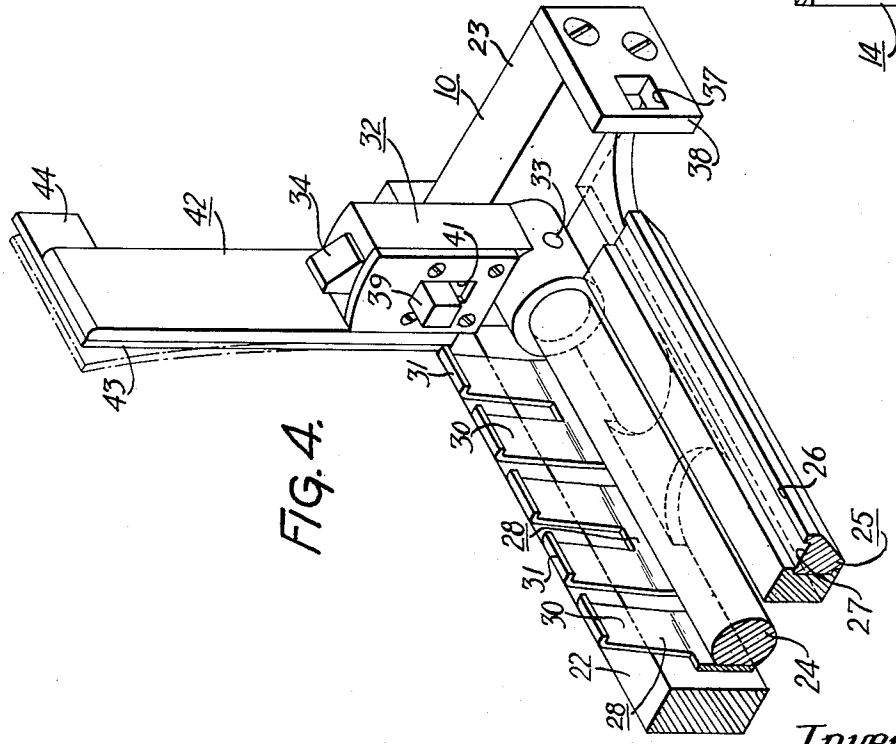


FIG. 4.

Inventor:
Daniel D. Huyett
by his Attorneys
Howson & Howson

United States Patent Office

2,693,634

Patented Nov. 9, 1954

2,693,634

IGNITER JIG FOR ELECTRIC BLASTING INITIATORS

Daniel D. Huyett, Wilmington, Del., assignor to Atlas Powder Company, Wilmington, Del., a corporation of Delaware

Application December 5, 1951, Serial No. 259,933

2 Claims. (Cl. 29—286)

The present invention relates to new and useful improvements in holders or jigs for supporting a plurality of igniters for electric blasting initiators in predetermined position relative to one another and to a corresponding plurality of pairs of wires preparatory to securing the wires to the igniters.

In the manufacture of electric blasting initiators or the like, a pair of wires is inserted through a resilient plug. An electric igniter or match is then fastened to the wires, for example, by soldering, and the plug and electric igniter assembly is then inserted into a loaded detonator shell. When such articles are manufactured on a production-line basis, it is desirable to fasten simultaneously a plurality of electric igniters to a like plurality of pairs of wires. To this end, means must be provided to support a plurality of electric igniters in a predetermined position with respect to each other and with respect to the wires.

With the foregoing in mind, the principal object of the present invention is to provide a novel device to support a plurality of igniters in a predetermined fixed relationship with respect to each other.

A further object of the present invention is to provide a novel holder or jig of the stated character which is operable to securely maintain a plurality of electric igniters in a predetermined position with respect to a corresponding plurality of pairs of wires while the wires are being secured to the electric igniters.

A still further object of the present invention is to provide a novel holder or jig of the type described having the features and characteristics set forth which is of relatively simplified construction and entirely efficient and effective in operation and use.

These and other objects of the present invention and the various features and details of the operation and construction thereof are hereinafter more fully set forth and described with reference to the accompanying drawings, in which:

Fig. 1 is a fragmentary plan view illustrating a holder or jig made in accordance with the present invention secured to the forward end of a wire tray, and maintaining a plurality of electric igniters in a predetermined relation with respect to a plurality of pairs of wires;

Fig. 2 is an enlarged fragmentary sectional view taken on line 2—2, Fig. 1, illustrating the means for maintaining the electric igniters in position on the holder;

Fig. 3 is an enlarged fragmentary sectional view taken on line 3—3, Fig. 1, illustrating the means for securing the holder to the wire tray;

Fig. 4 is an enlarged fragmentary perspective view of the end of an electric igniter holder;

Fig. 5 is an enlarged fragmentary perspective view of a tray for supporting the wires to which the electric igniter holder of the present invention is adapted to be secured;

Fig. 6 is an enlarged fragmentary sectional view taken on line 6—6, Fig. 1; and,

Fig. 7 is an enlarged perspective view of an electric igniter and a resilient plug having a pair of wires extending therethrough.

Referring more specifically to the drawings, reference numeral **10** designates generally an electric igniter holder or jig which is adapted to support a plurality of electric igniters **11** in a predetermined position with respect to each other and to a corresponding plurality of pairs of wires. The holder or jig positions an igniter intermediate of the ends of each pair of wires **12** which extend

through a resilient plug **13**. As illustrated in Fig. 1, the holder **10** is adapted to be secured to the forward end of a tray **14** which is the subject of a co-pending application, Serial No. 254,178, filed October 31, 1951.

With reference to Figs. 1 and 5 of the drawings, the tray or jig **14** for supporting the wires comprises a tray portion **15** on which spools or bundles of wires may be placed. The wires extend from the spools or bundles through a clamping member **16** which securely grips the wires between a pair of rubber gaskets and prevents displacement of the wires with respect to the tray **14**. Positioned at the forward end of the tray **14** is a displaceable guide **17** which is telescopically mounted in side wall portions **18** of the tray **14** and is normally urged to a forward limit position by means of springs (not shown). In the present instance, the wires extend through the displaceable guide **17** and have resilient rubber plugs secured thereon as illustrated in Fig. 2. A plug support **19** having a plurality of funnel-shaped openings **21** therein is positioned over the plugs **13** and secured to the displaceable guide to maintain the plugs **13** in their desired position.

In accordance with the present invention, the holder or jig **10** comprises a cross frame member **22** which extends the full width of the holder and terminates in rearwardly extending leg portions **23**, **23** which are adapted to be slidably engaged by the side wall portions **18** of the tray **14**. As more fully described hereinafter, the cross frame member **22** and leg portions **23** may be moved longitudinally with respect to the side wall portions **18** of the tray **14** to properly position the holder **10** on the tray **14**.

Extending between the opposite leg portions **23** and rotatably mounted therein is a shaft **24** positioned in spaced parallel relationship with the cross frame member **22** as more fully described hereinafter. The shaft **24** is adapted to be rotated between predetermined limit positions. In one limit position of the shaft **24**, the electric igniters **11** are secured to the holder and, in the other limit position thereof, the igniters may be readily removed from the holder.

As previously described, means are provided to support the electric igniters in a predetermined fixed position on the match holder or jig. To this end, a support **25** is positioned longitudinally of the holder in spaced parallel relationship with the shaft **24** as illustrated in Figs. 1, 2 and 4. An upwardly extending lip portion **26** at the extreme rear surface of the support **25** provides a trough **27** therein for the reception of the heads **11***a* of the electric igniters. The igniters **11** are placed on the support **25** with their heads **11***a* positioned in the trough **27** and their stems **11***b* extending rearwardly of the support over the lip portion **26**.

Means are provided to releasably secure the igniters **11** in this position on the support **25**. To this end, a plurality of clips **28** are secured to the rotatable shaft **24** as indicated at **29**. The clips **28** have a pair of rearwardly extending finger portions **30** thereon which terminate in downwardly extending projections **31** as illustrated in Fig. 2. By this construction, the finger portions **30** pass over the heads of the igniters and the projections **31** engage the upper surfaces of the igniter stems. To secure the igniters in position on the support, the shaft **24** is rotated to its extreme clockwise position with respect to Fig. 2, thereby causing the downwardly extending projection **31** on the clips **28** to engage the upper surface of the igniter stems and securely grip the igniters between the end portions of the clips **28** and the upper surface of the lip **26**. In order to release the igniter from the holder, the shaft **24** is rotated in the counterclockwise direction with respect to Fig. 2 to its other limit position, thereby permitting the igniters to be removed from the support.

In accordance with the present invention, means are provided to lock the shaft **24** in its clockwise limit position wherein the clips **28** engage the igniters **11**. To this end, a latch casing **32** is fixedly secured to each end of the shaft **24**, for example by means of pins **33**, as illustrated in Figs. 1, 3 and 4. Each of the latch casings **32** have latch members **34** slidably mounted therein for forward and rearward movement with respect to the

support 25 between predetermined limit positions. The latch members 34 are normally resiliently urged to their extreme rearward position with respect to the support 25 by means of coil springs 36 which are held captive in the latch casings 32 and engage the forward surface of the latch members 34. When the clips 28 are in engagement with the igniters on the support 25, the latch members 34 are in axial alignment with openings 37 extending through keepers 38 secured to the inner ends of the lug portions 23 as illustrated in Fig. 4. The coil springs 36 resiliently urge the latch members 34 into engagement with the keepers 38 thereby preventing movement of the shaft 24 and clips 28. An operating lever 39 secured to each of the latch members 34 and extending outwardly through openings 41 in the latch casings 32 permit the latch members 34 to be withdrawn from engagement with the keepers 38 thereby allowing the shaft 24 to be rotated to its other limit position.

After a plurality of igniters have been positioned on the support 25, the shaft 24 is rotated in the clockwise direction thereby placing the clips 28 in engagement with the igniters 11 and securing them to the holder. The holder 10 is then secured to the forward end of the tray 14 to position the stems of the igniters 11 between the ends of the wires 12. In order to fasten the latch holder 10 to the tray 14, a bracket 42 which carries a spring clip 43 is secured to the upper surface of each of the latch casings 32. The spring clips 43 extend rearwardly of the holder 10 and terminate in outwardly projecting lug portions 44 which are adapted to engage wedge-shaped projections 45 extending upwardly from the side frame members 18 of the wire tray 14.

By this construction, after the igniters have been secured to the holder, the spring clips 45 are in a substantial horizontal position. As the holder 10 is positioned between the side frame members 18 of the tray 14 as previously described, the outwardly projecting lugs 44 engage the upper surface of the side frame members 18. Relative rearward movement of the holder 10 with respect to the tray 14 causes the lugs 44 on the spring clips 43 to be biased upwardly over the wedge-shaped projections 45 on the side frame members 18 of the tray and interlocked behind the projections 45, thereby securing the holder to the tray 14. When it is desired to release the holder from the tray, the latches 34 are withdrawn from engagement with the keepers 38 and the shaft 24 is rotated in the counter-clockwise direction thereby removing the spring clips 43 from engagement with the projections 45.

From the foregoing, it will be observed that the present invention provides novel apparatus which is operable to support a plurality of igniters in a predetermined fixed relation. Furthermore, the present invention provides a novel electric igniter holder or jig which is operable to securely maintain a plurality of electric igniters in a predetermined position with respect to a plurality of pairs of wires while the wires are being secured to opposite sides of the electric igniters.

While a certain embodiment of the present invention has been illustrated and described herein, it is not intended to limit the invention to such a disclosure and changes and modifications may be incorporated and embodied therein within the scope of the following claims.

I claim:

1. An igniter jig adapted to support a plurality of electric igniter elements in predetermined fixed relation with respect to each other and to a corresponding plurality of pairs of wires carried by a wire support, comprising a frame having rearwardly extending leg portions at opposite sides thereof, a transverse support extending between said frame leg portions and having a recess extending longitudinally thereof to receive said igniter elements, a shaft extending between the frame leg portions in spaced parallel relation to said transverse support, mounting means for said shaft rotatable between predetermined limit positions, a plurality of clips secured to said shaft, the terminal end portions of said plurality of clips terminating in a line parallel to the axis of said trough and operable in one limit position of the shaft to engage upon said igniter elements in said trough and clamp the same in position upon said transverse support, latch mechanism to releasably secure said shaft in said one limit position, and means to secure said igniter jig to said wire support to position the igniter elements in said predetermined fixed relation with respect to the wires.

2. An igniter jig adapted to support a plurality of electric igniter elements in predetermined fixed relation with respect to each other and to a corresponding plurality of pairs of wires carried by a wire support, comprising a frame having rearwardly extending leg portions at opposite sides thereof, a transverse support extending between said frame leg portions and having a trough therein to receive said igniter elements, trunnions rotatably mounted in said frame leg portions for movement between predetermined limit positions, a shaft extending transversely between said leg portions and having its opposite ends fixedly mounted in said trunnions, a plurality of clips secured to said shaft and operable in one limit position of the shaft to engage upon said igniter elements and clamp the same in position upon said transverse support, latch mechanism to releasably secure said shaft in said one limit position, and means to secure said igniter jig to said wire support to position the igniter elements in said predetermined fixed relation with respect to the wires.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,257,122	O'Connor	Sept. 30, 1941
2,401,176	Muller	May 28, 1946
2,606,269	Craig	Aug. 5, 1952