

Dec. 15, 1970

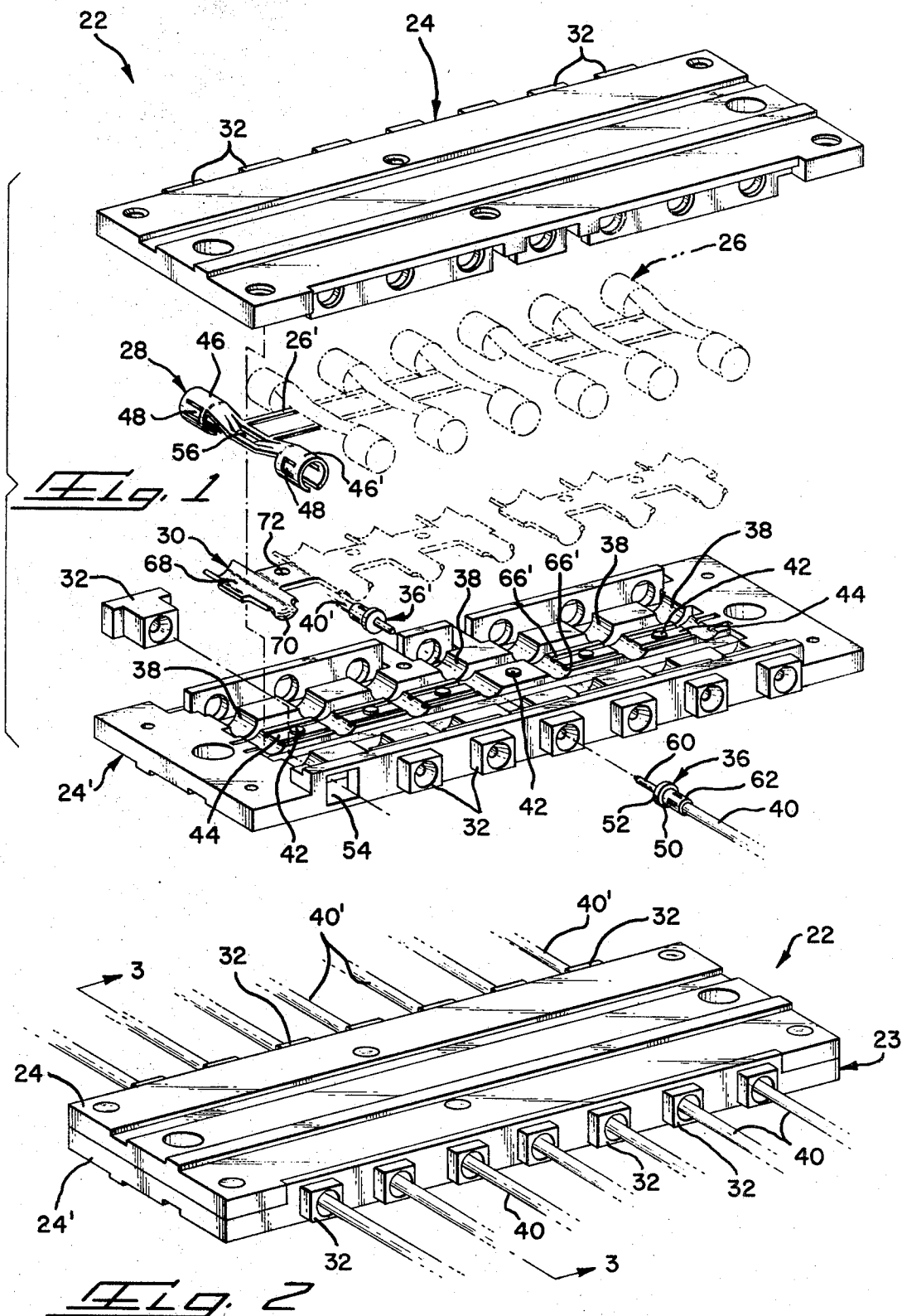
H. L. BRUETSCH

3,548,367

WIRE SPLICING UNIT

Filed May 27, 1969

3 Sheets-Sheet 1



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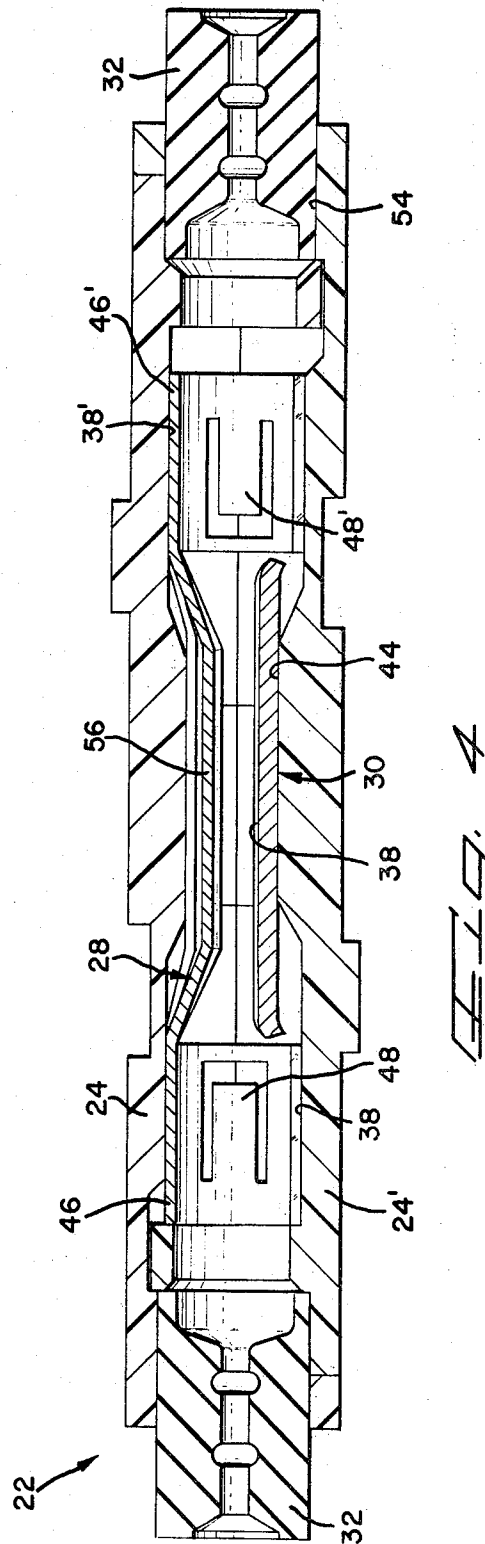
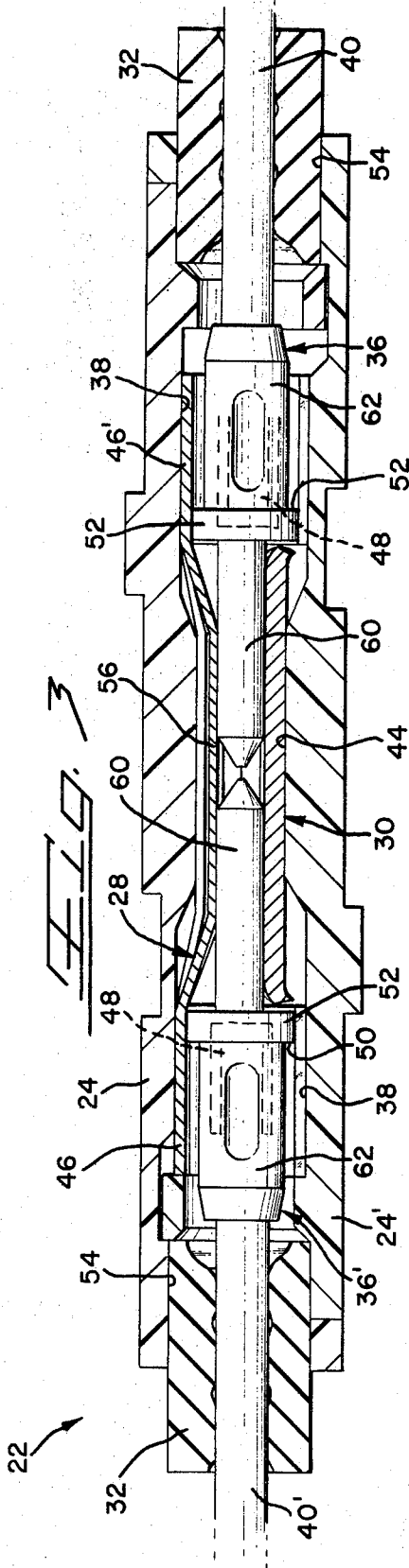
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WIRE SPLICING UNIT

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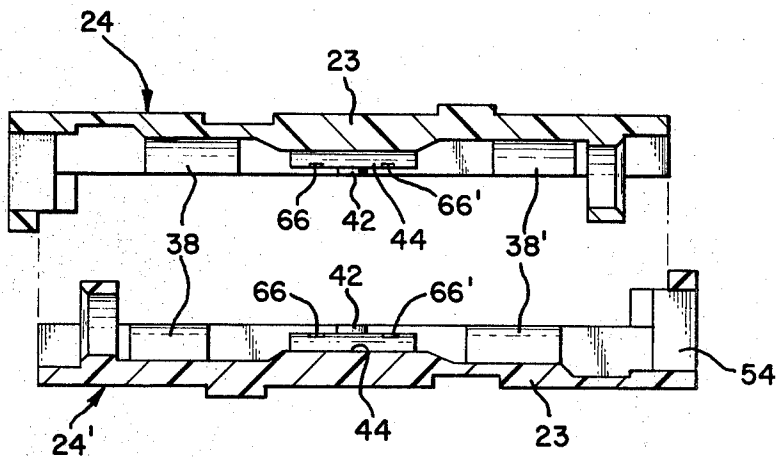


FIG. 5

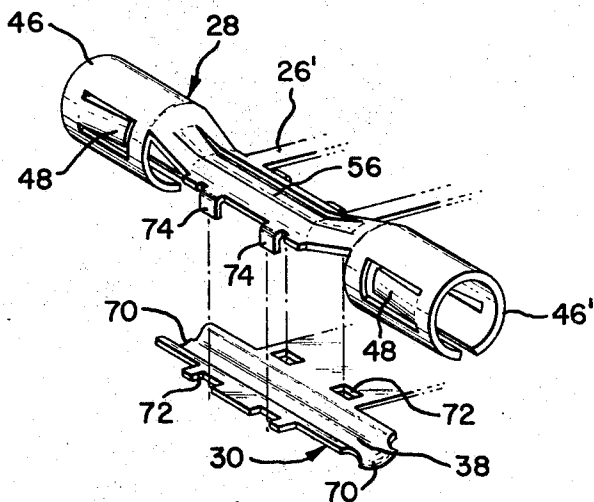


FIG. 6

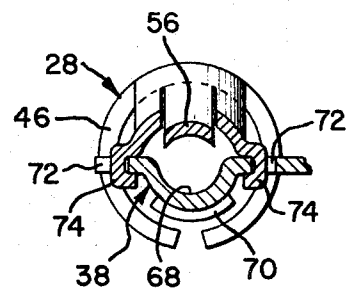


FIG. 7

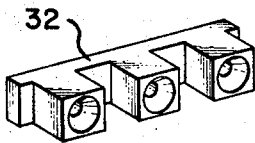


FIG. 8

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3,548,367

WIRE SPLICING UNIT

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U.S. Cl. 339—205

4 Claims

ABSTRACT OF THE DISCLOSURE

A wire splicing unit having an insulated housing and a plurality of generally side-by-side hollow interior portions. Each of the hollow interior portions have an internal connector member for receiving a pair of wires to be spliced. Each of the internal connector members have a conductive strip connecting adjacent members and extending above the hollow interior portion and to the vicinity of an access opening formed transversely across a plurality of side-by-side hollow interior portions.

There are a great many applications in the packaging of electronic equipment wherein space limitations are critical and the use of miniaturized electronic components such as connectors are required. Because of this requirement, much work has been done in the recent past to make such components smaller. In the connector art, the main effort has been directed towards reducing the size of the conventional designs now commercially available. However, because of the construction of standard size, commercially available connectors have not been found suitable for miniaturization. This leads to the present invention which relates to quick operating wire splicing devices wherein wire ends are provided with external contacts and are detachably connected together in any combination. In particular, this invention relates to an internal splice contact having female connector portions and having a conductive strip for electrically connecting the female connector portions of adjacent splicing pairs.

This invention is particularly applicable where it is desirable to form a common splice between a multiplicity of wires without resorting to relatively expensive connectors and cumbersome interconnections, and where the splicing device can quickly connect and disconnect the wires.

The quick splicing device of the invention has many advantages since it operates successfully in an environment preventing shock, vibration, and thermo-variations which tend to disrupt the cooperable electrical connections. Furthermore, the electrical systems in which such a splicing device is an integral part, may require that the electrical circuit not be interrupted for even a small interval of time experienced through conditions such as vibration and shock.

In addition to the need for continuous electrical connection between the contacts of a wire splicing device, means must be provided to assure that the contacts remain clean of foreign materials prior to the use of the splicing device. Dust or other foreign particles collected at a wire splicing contact can readily disrupt or hinder the proper functions of a sensitive electrical network.

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Also, it is highly desirable in many circumstances to provide a device having all of the above properties and also having a means for connecting a given splice pair with any given number of additional splice pairs wherein the connection between adjacent splice pairs may be readily separated by a user.

It is also an object of this device to provide a wire splice device which employs a resilient tubular splicing member and which has means for connecting adjacent splicing pairs and for readily disconnecting such pairs without permanently exposing the splicing unit to dust, moisture, and other foreign particles.

It is another object of this invention to provide a readily detachable wire splice unit wherein adjacent splice pairs are connected by a conductive strip and wherein the conductive strip may be severed to maintain electrical isolation of a chosen splice pair without interfering with the electrical combination of other spliced pairs.

These and other objects, features, and advantages of the present invention will be understood in greater detail from the following description and the associated drawings wherein reference numerals are utilized in designating an illustrative embodiment.

As shown in the drawings: FIG. 1 is a perspective sketch illustrating the wire splice device;

FIG. 2 is a perspective sketch illustrating the wire splice device assembled;

FIG. 3 is a cross-section view along the lines 3—3 of FIG. 2;

FIG. 4 is a view similar to that shown in FIG. 3 without the wires being shown therein;

FIG. 5 is a cross-section view of the two housing halves unassembled;

FIG. 6 is a perspective sketch illustrating the current carrying member and the ferrule member disassembled;

FIG. 7 is a plan view illustrating the current carrying member assembled to the ferrule member; and

FIG. 8 is a perspective sketch illustrating the grommet portion of this invention.

According to this invention (FIG. 1), a wire splicing unit 22 comprises an insulating housing having two halves 24 and 24' with a plurality of generally hollow interior portions 38 formed in side-by-side relationship for splicing a number of wire pairs such as the pairs 40 and 40'.

The insulating housing 23 has a top section 24 and a bottom section 24'. The top section 24 and the bottom section 24' are inter-fitted hermaphroditically in such a manner as to completely enclose the generally hollow interior portions 38.

The current carrying member 30 has a rounded surface 68 which snugly fits within the hollow interior portion 38. Both ends of the current carrying member 30 have flared ends 70 which facilitate the entry of contacts on the ends of the wires 40 and 40'.

In particular, holding lugs 42 are disposed adjacent the hollow inner portions 38 for gripping the current carrying member 30. The second member (FIG. 1) is an internal multiple connector strip 28 having ferrule members used to make electrical connection between the contact ends 36 and 36' of the wires 40 and 40'. The multiple connector strip 28 may be rolled to have a generally cylindrical wall 46 from which a number of tines 48 may be bent inwardly thereof for the purpose of

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gripping an end surface 50 formed about a cylindrical wall 52 of the contact end 36.

The alternate embodiment (FIG. 6) is substantially the same as the embodiment shown in FIG. 1 except that the current carrying member 30 has an aperture 72 which receives the tab 74 on the ferrule member 28. These tabs 74 enter the aperture 72 and are bent over so as to secure the ferrule member 28 to the current carrying member 30.

The housing half 24' has open end sections 54 for receiving a molded rubber end seal 32. The rubber seal 32 provides for a dust free seal with the external pin connector or end contact 36. The end seals 32 may be formed to completely enclose the opened end sections 54 of the housing 23. The housing 23 has a plurality of hollow interior portions, some of which may not at any one time be in use. However, each hollow interior portion is in communication with other hollow interior portions, and accordingly, dust, moisture and other foreign matter would be allowed to circulate throughout the system if any of the opened end sections were exposed to the atmosphere.

The holder portions 42, as shown in FIG. 1, extend above the surface 44 on the bottom housing half 24' and engage openings in the connector strip portion of the current carrying member 30.

The multiple connector strip is formed from a flat sheet. In particular, a flat sheet may be cut along specified lines and rolled to form the generally cylindrical configuration of the multiple connector strip.

The current carrying member 30 is the element which is utilized to make the electrical contact between the wires to be spliced, and for this purpose, the member 56 of the multiple connector strip 28 is provided with a specified amount of resiliency. Resiliency in the electrical connector member is desirable if a firm contact is to be made with the wires being spliced.

Accordingly, the contact members 56 are designed to maintain a uniform electrical contact between the contact ends 36 and 36' of the wires 40 and 40' to be spliced.

The multiple connector strip 28 is provided generally with the tubular end portions 46 and 46' for receiving the contact ends 36 and 36' of the splicing wires 40 and 40'. The tubular end portions 46 and 46' are split longitudinally. Also, the tubular end portions 46 and 46' allow the insertion of a pin therein with the pin having an outside diameter of less than that of the tubular portions 46 and 46'.

As shown in FIG. 1, the bottom half 24' of the insulating housing 23 has a surface 44 formed for receiving the multiple connector strip 28. The surface 44 also has contoured edges 38 and 38' which are mated to the tubular end portions 46 and 46'. Due to this relationship between the multiple connector strip 28, axial movement of the connector resisted during the insertion of the end contacts 36 and 36' within the tubular end portions 46 and 46' is prevented.

The pin connectors or end contacts 36 and 36' associated with the wires 40 and 40' are shown in FIGS. 1 and 3. Generally, the pin connector consists of a standardized cylindrical contact 36 having a rounded head 60, wire barrel 62 and a shoulder 50 which is formed at the cylindrical wall 52. The wire barrel portion 62 is fixedly secured in a well understood manner to the associated wire or cable 40. The contact 36 is positioned interiorly of the tubular end portion 46 and is firmly gripped therein due to the resilient nature of the tubular portion 46. As shown in FIG. 3, a firm contact between the tubular portion 46, for instance, and the cylindrical contact 36 is further accomplished by the nature of the cross-sectional configuration of the tubular portion 46.

The wire barrel portion 62 of the pin connector is disposed axially within the sections 46, 46' of the ferrule member 28 so that the shoulder 50 is locked against the wall of the ferrule member due to the presence of the

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times 48 which are positioned against the surface 50 of the cylindrical wall 52 according to the technique described in our copending application, Ser. No. 801,473.

In various electrical uses, it may not only be desirable to splice the wire 40 to the wire 40', but it may also be desirable to join a number of sets of spliced wires together. On the other hand, it may be also desirable to select from a number of available choices which wires are to be electrically joined and which wires to be electrically isolated from the remaining wires in a given wire splicing unit.

The wire splicing unit of FIG. 1 is provided with slots or openings 66 and 66' which are formed generally transversely of the hollow interior portions 38 of the housing 23. These openings 66 and 66' cut across the hollow interior portions 38, thereby communicating each of the hollow interior portions 38 with each other hollow interior portion. This communication between the hollow interior portions 38 then allows the positioning of a conductive member 30 along the length of the opening 66 and 66' to interconnect each of the internal ferrule connectors 26.

For the purpose of interconnecting adjacent internal ferrule connectors 26 and for providing that the connection will be readily severable at the will of the user, a central portion 26' of the ferrule connector 26 is thereby provided.

The combination of the multiple connector strip 28 and the current carrying member 30 may be said to comprise a conductive arrangement which is disposed in such a way as to have any combination of wire ends 40 and 40'. The tubular end portions 46 and 46' are orientated in such a manner as to be readily severable by a user. For instance, the multiple connector strip 28 is spaced, such that a user may readily sever the connector strip with a cutter to electrically isolate one or more of the wire splicing sets.

It will be understood that various modifications of the embodiment disclosed herein may be accomplished by those versed in the art, but we desire to claim all such embodiments as properly come within the scope and spirit of our contribution to the art.

The invention is claimed in accordance with the following:

1. A wire splice device comprising a housing having side-by-side hollow interior portions separated by walls, said hollow interior portions containing current carrying members which relay current from one hollow interior portion to an adjacent hollow interior portion, said current carrying member having rounded bottom sections which fit snugly into said hollow interior portions, said current carrying members substantially transversing the length of said housing, a ferrule member engaging each current carrying member, said ferrule members adapted to receive wires having contacts crimped thereon, one wire entering each end of the ferrule member so as to contact the current carrying member, means to prevent the entry of dust and other foreign particles from entering into said housing disrupting electrical contact between the contact ends of said wires.

2. A wire splice assembly as defined in claim 1 and further characterized by said housing having a removable portion in communication with said current carrying member and affording access thereto to permit isolation of cavities which are not required to be electrically interconnected, said housing having openings formed transversely thereof and cutting across a plurality of the side-by-side hollow interior portions in the vicinity of said ferrule member.

3. A wire splicing device in accordance with claim 2 wherein said device comprises a member having tubular contact portions formed at opposite ends thereof, said tubular contact portions being split longitudinally for allowing the resilient insertion and holding of a contact end of a wire.

4. A wire splicing unit comprising an insulating hous-

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ing having a plurality of generally side-by-side hollow interior portions, a current carrying member and a ferrule member positioned within each of said hollow interior portions, said ferrule member having tabs for engaging slots in said current carrying member and having gripping portions for detachably engaging the contact ends of a pair of wires, said insulating housing having slots formed transversely thereof and cutting across a plurality of side-by-side hollow interior portions in the vicinity of said current carrying members, said slots being for the purpose of accepting said tabs on said ferrule member.

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References Cited

UNITED STATES PATENTS

3,383,643	5/1968	Nava et al.	339—205
3,383,644	5/1968	Nava et al.	339—205

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R. A. HAFER, Assistant Examiner

U.S. Cl. X.R.

339—248, 258