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2,328,294

CONNECTOR

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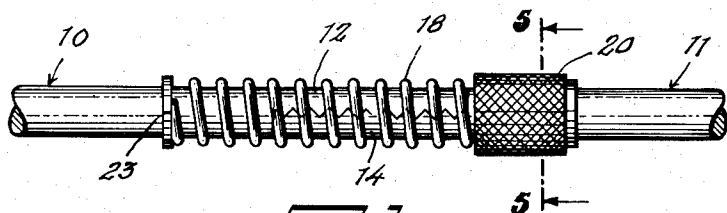


FIG. 1

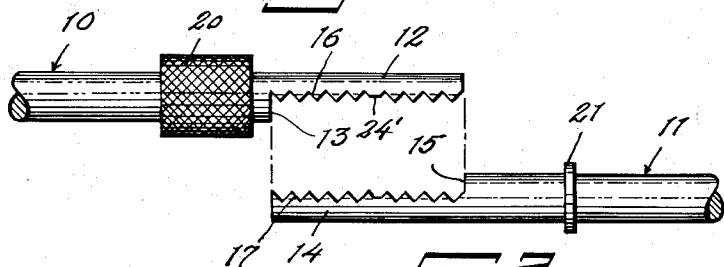


FIG. 2

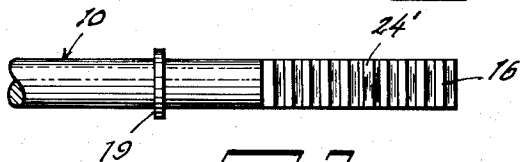


FIG. 3

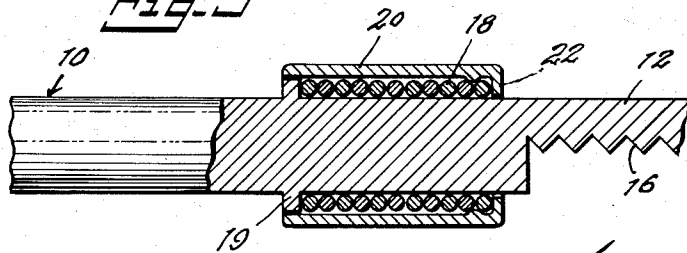


FIG. 4

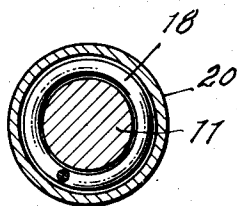


FIG. 5

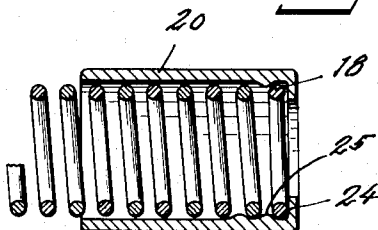


FIG. 6

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CONNECTOR

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9 Claims. (Cl. 287—104)

This invention relates to fittings, and more particularly to connector fittings for releasably connecting the ends of cables, rods and other like members or parts.

An object of the invention is to provide a connector which is simple in construction, is inexpensive to manufacture, is positive in operation, is light and strong, and may be locked and released by hand manipulation and without the aid of a tool.

Other objects and advantages of the invention will be hereinafter set forth.

As an example of one environment in which connectors of the type herein disclosed are more or less extensively used, aircraft may be mentioned.

In the drawing, wherein like reference characters denote like or corresponding parts:

Fig. 1 is a side elevation of a connector showing the terminal portions connected and locked;

Fig. 2 is a similar view showing the terminal portions unlocked and disconnected;

Fig. 3 is a similar view of one terminal portion taken at right angles to the showings of Figs. 1 and 2;

Fig. 4 is an enlarged longitudinal sectional view of Fig. 2;

Fig. 5 is an enlarged cross-sectional view on the line 5—5 of Fig. 1; and

Fig. 6 is a longitudinal sectional view of the sleeve or collar showing the manner in which the spring is attached.

In the embodiment of the invention selected for illustration, 10 and 11 designate the respective terminal portions of the connector. Both terminal portions are of full round or circular section and of similar size and shape. The terminal portion 10, at one end, is provided with an extension 12, and at the inner end of the extension 12, a shoulder 13 is formed. A similar extension 14 and shoulder 15 are formed on the other terminal 11. Preferably, the extensions 12 and 14 are of substantially identical length and each, in cross-section, is half round or semi-circular—the extension 12 having formed on its flat surface, transverse serrations or teeth 16, and the extension 14 having formed on its flat surface, transverse extensions or teeth 17—the serrations or teeth, in each instance, and in the overlapping position thereof, being adapted to snugly interfit and hence interlock with the shoulders 13 and 15, respectively abutting the extension ends. Thus assembled, and when held together as shown in Fig. 1, obviously, due to the interfit, the terminals are interlocked and

held against relative axial or longitudinal movement. Also, when thus interlocked, the overlapping extensions 12 and 14 provide in the aggregate a full round section identical in size and shape with that of the remaining portion of the connector length.

The means for holding the overlapping extensions against lateral separation when interlocked comprises a spring 18. Said spring is preferably a spiral spring adapted to fit snugly around both terminal portions. At one end said spring bears against a flange 19 formed on the terminal portion 10. This flange is preferably spaced from the shoulder 13 a distance equal to the length of the sleeve or collar 20 by means of which the spring is manually compressed and extended. A similar flange 21 is formed on the terminal portion 11. The opposite end of the spring 18, however, does not bear against the flange 21. Said flange acts merely as a stop to limit the sliding movement of the collar 20 when manipulated to expand the spring.

By snugly fitting the spring, i. e., all of its convolutions around the terminal portions, the overlapping interlocking extensions 12 and 14 thereof are firmly held against lateral separation. Such snug fit also acts to automatically preclude expansion and contraction of the spring except by proper manipulation of the collar. The collar, it will be noted, has an inside diameter slightly larger than the outside diameter of the terminal portions, and within its embrace one end of the spring extends. At the end of the collar remote from the flange 19 a shoulder 22 is formed, and it is this shoulder which is adapted to engage the flange 21 to limit the sliding movement of the collar.

Any attempt to compress the spring by merely sliding the collar toward the flange 19 would only cause its convolutions to frictionally bind against the outer surface of the connected terminal portions. A combined rotating and sliding movement of the collar is required. And this is equally true, though to a lesser degree, if an attempt be made to slide the collar to effect expansion of the spring.

To prevent binding of the spring during collar manipulation, all that is required is that its convolutions be slightly loosened simultaneously as the collar is slid lengthwise the connector terminal portions. This is accomplished by fastening one end of the spring to the flange 19 at 23 and the opposite end of the spring to the collar 20 at 24—preferably by soldering. Thus fastened, rotation of the collar in one direction

simultaneously as it is slid lengthwise the terminal ends, will tend to unwind the spring, while rotation thereof in the opposite direction will tend to wind it, and hence more firmly bind it to said terminal ends. Obviously, therefore, by turning the collar counter to the direction of the coil of the spring convolutions simultaneously as it is slid lengthwise of the terminal ends, the spring may be either freely expanded or freely compressed as desired. When fully compressed, all convolutions of the coil spring are completely housed within the embrace of the collar. When fully expanded, the convolutions of the spring embrace the extensions 12 and 14 and by such embracement hold said extensions against lateral separation. If desired, and as a further means to prevent sliding movement of the collar to expand the spring, once it is fully compressed, the open end of the collar and the flange 19 may be so dimensioned as to frictionally engage—the latter within the embrace of the former, as shown in Fig. 4.

As an added safety feature, one or more of the mating serrations may be given an odd configuration such as that shown at 24' in Fig. 3, to prevent mating thereof except when properly brought together with a full overlap. This added feature, however, is optional and may be dispensed with if desired. If dispensed with, and the total number of serrations are identical, the effective length of the connector may be varied in direct proportion to the extent of the overlap. In other words, it is not essential under all circumstances that the shoulders 13 and 15 about the respective extension ends. Moreover, as a further means of holding one end of the spring fitted to and within the collar, one or more spiral convolutions 25 may be formed on the inside of the collar adjacent to its flanged end and into the spiral of which the spring is adapted to be screwed.

A connector thus characterized is possessed of that factor of safety most desired. It can be neither released nor locked accidentally, and is completely foolproof. It is simple in construction, inexpensive to manufacture, easy to manipulate, equally effective both in tension and compression, and requires no tool for its manipulation.

While I have described my invention in detail in its present preferred embodiment, it will be obvious to those skilled in the art, after understanding my invention, that various changes and modifications may be made therein without departing from the spirit or scope thereof. I aim in the appended claims to cover all such modifications and changes.

I claim as my invention:

1. A connector comprising mating terminal portions adapted for a substantial portion of the length thereof to overlap and interlock, an abutment carried by one said terminal portion, a compressible helical spring bearing at one end on said abutment and adapted, when not compressed, to encircle said mating terminal portions at said overlap to hold said terminal portions against lateral separation at said interlock, and a collar slidable along said overlap and against which the other end of said spring is adapted to bear, said collar being adapted by its movement toward said abutment to compress said spring until both the collar and spring are entirely clear of said overlap.

2. A connector comprising mating terminal portions adapted throughout a substantial por-

tion of the length thereof to overlap and interlock, an abutment carried by one said terminal portion, a compressible helical spring adapted when extended to encircle said overlap and hold said terminal portions against lateral separation at said interlock, said spring when compressed bearing at one end against said abutment, and a collar of an inside diameter somewhat greater than the diameter of said spring slidable along said overlap to compress said spring, said spring when compressed sufficiently to uncover said overlap being confined for the major part within the embrace of said collar.

3. A connector comprising separable interlocked terminal portions, a compressible spiral adapted to encircle said interlocked terminal portions with the convolutions of the spring in substantially continuous contact with the outer surface of said terminal portions, an abutment to which one end of said spring is fastened, and a member movable both axially and rotatably with respect to said terminal portions and to which the other end of said spring is attached, said member by its combined axial and rotational movement being adapted to sufficiently relieve the contact between the spring convolutions and the outer surface of the terminal portions to admit of spring compression and expansion.

4. A connector comprising separable interlocked terminal portions, a compressible spiral spring for holding said terminal portions interlocked, said spring being so tightly wound about said terminal portions as to effectively resist full compression thereof in the absence of relative rotational movement between the spring ends, and means fastened to said spring operable to relatively rotate the spring ends to effect spring compression.

5. A connector comprising separable interlocked terminal portions, a compressible spiral spring embracing said terminal portions for holding said terminal portions interlocked, said spring being incapable of full compression to release said terminal portions in the absence of relative rotational movement of its ends, an abutment to which one end of said spring is fastened, and a lock releasing means fastened to the other end of said spring, said means being simultaneously rotatable and axially movable relatively to said terminal portions to compress said spring.

6. A connector comprising mating overlapping terminal portions each provided with a plurality of interfitting transversely extending serrations, at least one serration of each terminal portion having a configuration at variance with the remaining serrations whereby said terminal portions are incapable of being mated unless properly overlapped, and means to hold said overlapping terminal portions against lateral separation when overlapped and interlocked.

7. A connector comprising mating terminal portions adapted to overlap and interlock, and a helical spring fastened at one end relatively to one said terminal portion, said spring, when compressed, being adapted to uncover said terminal portions to admit of lateral separation thereof, and when extended being adapted to closely embrace said terminal portions to prevent lateral separation thereof.

8. A connector comprising mating terminal portions adapted to overlap and interlock, a helical spring fastened at one end relatively to one said terminal portion, said spring, when compressed, being adapted to uncover said terminal portions to admit of lateral separation thereof,

and when extended being adapted to closely embrace said terminal portions to prevent lateral separation thereof, and means movable lengthwise said terminal portions and bearing on the opposite end of said spring for effecting its contraction.

9. A connector comprising mating terminal portions adapted to overlap and interlock, a heli-

cal spring fastened at one end relatively to one said terminal portion, and means fastened to the opposite end of said spring for effecting its expansion and contraction, said means being movable both rotationally and longitudinally relatively to said terminal portions.

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