

J. CUNNINGHAM & W. H. HORNER.
 CONNECTION FOR COIL CASES AND CABLES.
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1,103,130.

Patented July 14, 1914.

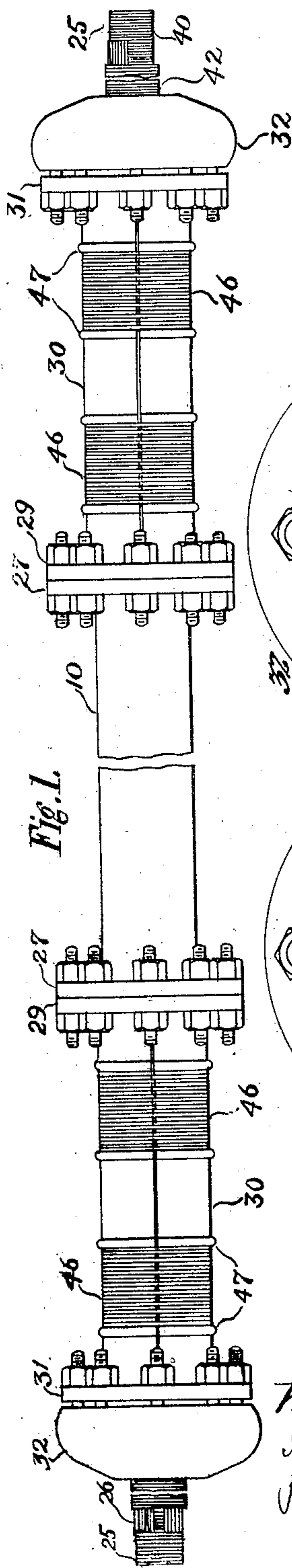


Fig. 1.

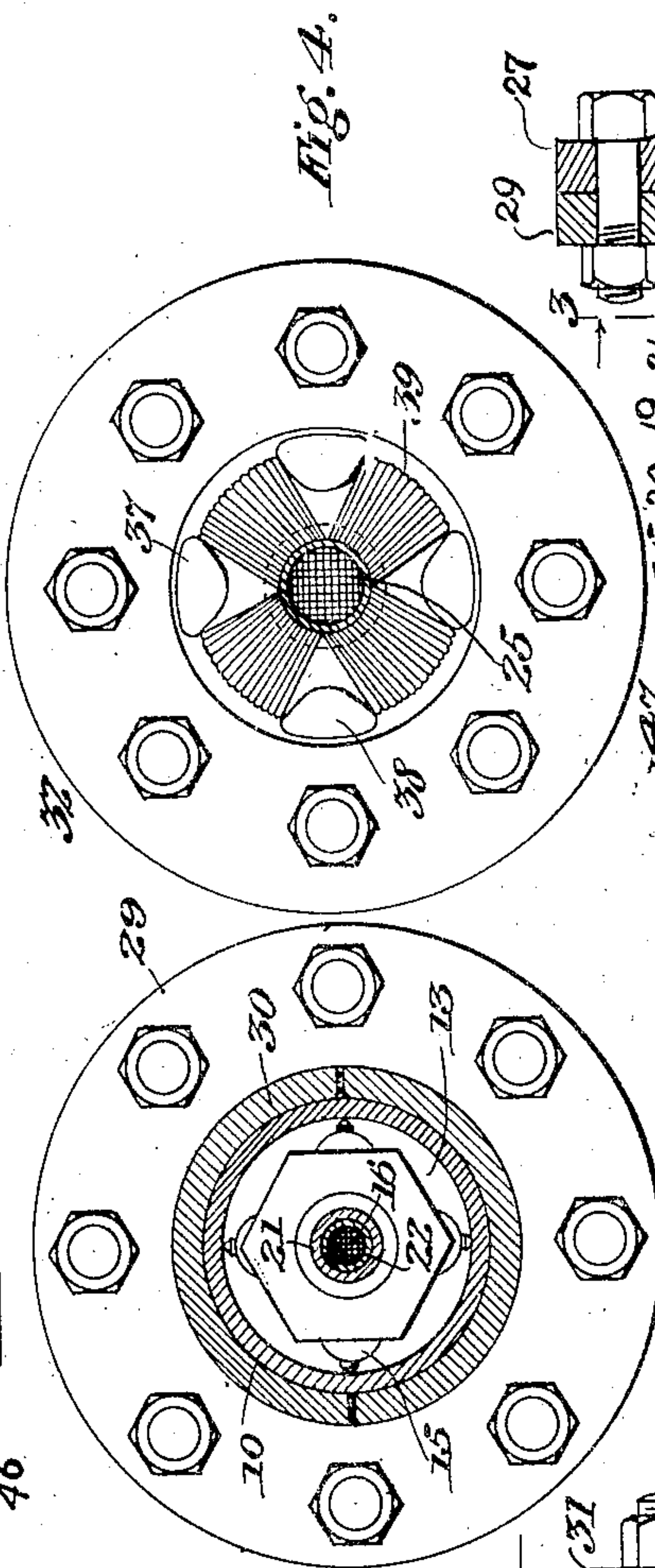


Fig. 3.

Witnesses:
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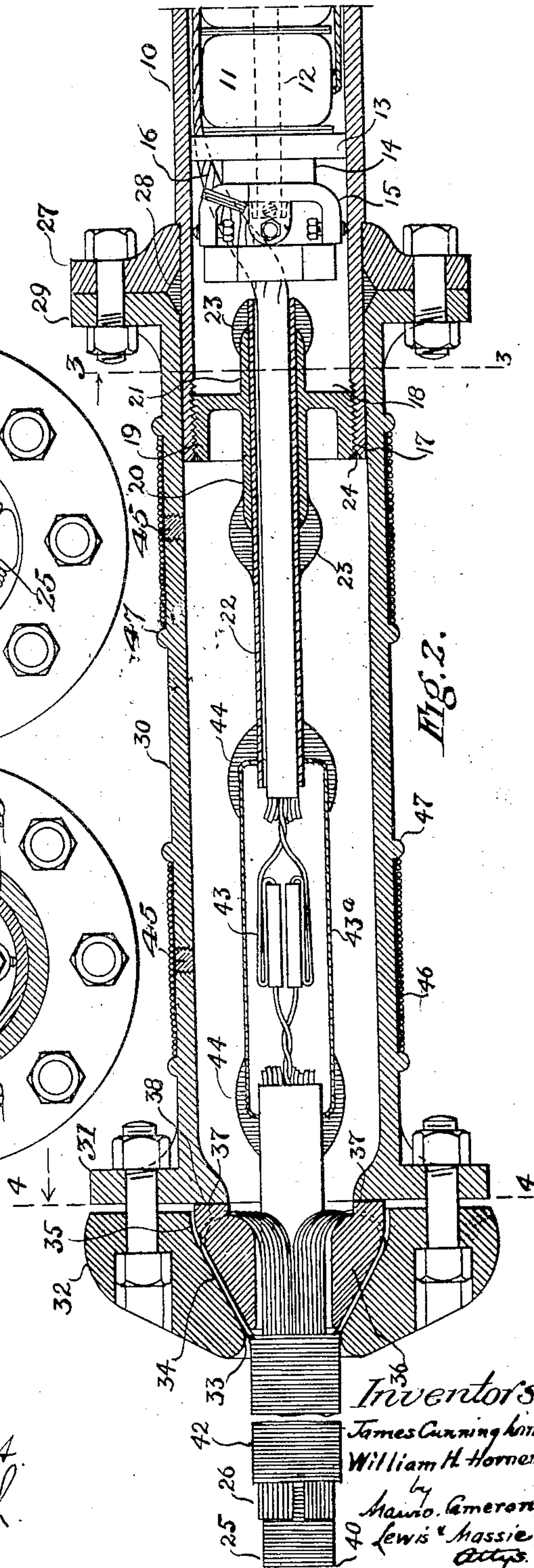


Fig. 2.

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UNITED STATES PATENT OFFICE.

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CONNECTION FOR COIL-CASES AND CABLES.

1,103,130.

Specification of Letters Patent.

Patented July 14, 1914.

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To all whom it may concern:

Be it known that we, JAMES CUNNINGHAM and WILLIAM H. HORNER, residing at Riverton and New York, in the counties of Burlington and New York and States of New Jersey and New York, respectively, have invented certain Improvements in Connections for Coil-Cases and Cables, of which the following is a specification.

This invention relates to cases for containing coils, such as loading coils used in telephone lines, and is especially directed to a device for submarine use, which may be connected to cables so as to become practically a continuation of their outer protective covering or armor. With this end in view, the improved case is of relatively small diameter, possesses in itself and in the joints with the cable a strength at least as great as that of said cable, perfectly excludes moisture and may be readily put in place and removed.

In the accompanying drawings, forming a part of this specification, Figure 1 illustrates in broken side elevation one embodiment of the invention connected in a cable; Fig. 2 is an enlarged central longitudinal section through one extremity of the case, the cable also being shown; Fig. 3 is a full transverse section upon the line 3—3 of Fig. 2; and Fig. 4 is a similar view on the line 4—4 of Fig. 2.

Throughout the various figures like characters of reference are applied to like elements.

The main case or container 10, for inclosing loading or other coils 11, is in the form of a continuous tube, extra heavy wrought iron pipe being suitable for this purpose. A convenient way of mounting the coils consists in placing them upon a wooden spindle 12, centered in the case by wooden washers 13 and secured against displacement by wooden nuts 14 threaded upon the ends of the spindle, and by metal spiders 15 abutting against the nuts and having through their arms set screws engaging the inner wall of the case. Short stub cables 16 carrying the terminals of the coils pass axially through opposite ends of the case.

The inner ends of the case are each threaded at 17 to engage a screw plug or head 18, having a depression formed between a cylindrical flange 19 and a nipple or short tube

20 surrounding an axial opening through the head and extending outside the depression. The tube is continued into the case by an extension 21, this permitting the exit from the case of the terminal cables 16. Each cable 16 has a comparatively loose section 22 of lead sheath, which extends through tube 20 and projects just inside and for a considerable distance outside the tube.

When the assembling of the case and its coils is to be completed, a metal seal is provided at every juncture between metal parts. To accomplish this, the sheath section 22 is first placed in position in the tube of each head and soldered thereto by wiped joints indicated at 23. Then the terminal cable is drawn through the sheath and tube, and the head screwed into place with the edge of the flange substantially flush with the edge of the case. The adjacent angles of the case and flange have been previously beveled to furnish a groove 24, and along this line these elements are welded, conveniently by an oxy-acetylene flame, a strip of Norway iron being fused in to fill the groove. The threaded engagement gives strength to this joint and the weld adds strength and an hermetic seal. To prevent the intense heat of the welding from injuring the cable and the contents of the case, a water-jacket is preferably employed outside and inside the weld during the operation, and the depression in the head is useful in furnishing a portion of this jacket. The coils are now incased in unbroken metal, save for the spaces between the cables 16 and their sheaths. After utilizing these spaces to test the integrity of the joints by creating, through them a vacuum in the chambers left in the case beyond the coils, said chambers and the sheath spaces are completely filled by forcing in a suitable insulating substance, as Bermudez asphalt.

The coils and case are now ready for connection with a submarine or main cable, the ends of adjacent sections of which are shown at 25, and to attain strength and an effective protection of the joint between the main and stub cable the usual wire armor 26 of the former is coupled to the case, and the cable joint is inclosed by this coupling means. As the connection at both ends of the case is the same, but one will be described. Near the end of the case is a flange

27, which, though it might be integral, as here shown is a separate disk shrunk upon the case and welded thereto at 28. In this flange are holes adapted to register with corresponding holes in the flange 29 of an auxiliary case, which is in the form of a longitudinally divided cylinder 30 consisting of two sections. To a similar flange 31 upon the outer extremity of the cylinder is secured by bolts one element of a securing device, which, as illustrated, is furnished by a collar 32 provided with an axial opening having a rounded wall 33 from which a tapered or conical wall 34 diverges to a cylinder portion 35. The recess furnished within the inclined and cylindrical walls receives a second loosely fitting member or thimble 36. Externally the thimble generally conforms to the walls of the recess, but has lugs or projections 37, of which four are illustrated, equally spaced from one another. The inner flat ends 38 of the lugs abut against the end of the cylinder 30, and hold it when the inclined surface of the collar is drawn toward the thimble by the bolts to secure the clamping effect. Between the lugs are spaces or openings 39 gradually curved under the inner end of the thimble and into the central opening for the purpose of receiving the members to be clamped.

In assembling the connecting elements, the wrapping 40 of jute, which is over the armor, and furnishes therewith the outer protective covering, is removed for a suitable distance from the end of the main cable, and the collar 32 is slipped over it and back out of the way. The thimble is placed upon the cable at the juncture of the jute covering and bared armor and is held against further movement of the covering by a serving of wire not shown. Then the armor wires are separated, bent back in equal groups through the spaces 39, and held against the cable while the collar is passed over the ends and brought into cooperation with the thimble. This having been done, the ends of the armor wires are secured to the cable by a serving 42 of galvanized iron wire. The conductors of the terminal and main cables are now spliced in any suitable manner, care, however, being taken to leave sufficient slack in each conductor by means of a doubled portion 43 to allow for stretching of the core under strain. The splice is covered by the usual lead sleeve 43^a soldered to the cable sheaths at 44. When the splice is complete, the divided cylinder 30 is placed about it between the case flange and collar, with a gasket between the opposite edges of the sections, and bolted in place. The tightening of the bolts connecting the cylinder and collar 32 draws the latter against the armor wires lying in the spaces 39 and clamps them against the thimble, the gradually rounded surface pre-

venting them from being strained or otherwise injured. The cable armor is thus firmly joined to the case, the strength of the connection being not less than that of the cable. Moreover, the greater the tension upon the clamping members the more closely the armor wires are held between them. The splice is further protected by calking the space between the collar and the cylinder flange with oakum soaked in Stockholm pine tar, and the cylinder is filled with rosin oil through openings, which are afterward closed by screw plugs 45. The cylinder is reinforced by serving with galvanized iron wire 46 held between circumferential ribs 47.

It is desired to especially direct attention to the ease and rapidity with which the case and coils arranged in accordance with this invention may be connected in a cable. Heretofore an effort has been made to include coils and their inclosures within the armor of the cable itself by carrying the armor wires over the case from each side and splicing them. This, when properly performed, is so difficult an operation and requires such a length of time that with submarine cables it is often interrupted by rough weather, while with the clamping and connecting elements described herein, the work may be done with great quickness by persons not especially skilled, yet with a high degree of security. If it becomes desirable to remove a case and coils, this may be readily done and without injuring the parts.

We claim:

1. The combination with a main cable having a protective covering, of a casing structure carried by and connected between ends of said main cable, said casing structure including a main case and two auxiliary cases attached to the ends of the main case respectively, terminal or stub cables extending from the main case into the auxiliary cases, and splices located in the auxiliary cases, respectively, and connecting said terminal cables with the ends of the main cable.

2. The combination with a main cable and a coil adapted to be connected therewith, of a casing structure carried by the main cable, said casing structure including a main case inclosing said coil and an auxiliary case attached to and extending outward from the main case, a terminal cable extending from the coil in the main case into the auxiliary case, and a splice between the main cable and terminal cable situated in the auxiliary case and connecting the coil to the main cable.

3. The combination with a main cable and a coil adapted to be connected therewith, of a casing structure carried by the main cable, said casing structure including a main case inclosing said coil and an auxil-

5 iary case attached to and extending outward from the main case and adapted to be opened to give access to a splice located therein, a terminal cable extending from the coil in the main case into the auxiliary case, and a splice between the main cable and terminal cable situated in the auxiliary case and connecting the coil to the main cable.

10 4. The combination with a main cable and a coil adapted to be connected therewith, of a casing structure carried by the main cable, said casing structure including a main case inclosing said coil and an auxiliary case attached to and extending outward from the main case and longitudinally divided into
15 separable sections one of which is removable to give access to a splice located in the auxiliary case, a terminal cable extending from the coil in the main case into the auxiliary case, and a splice between the main cable and terminal cable situated in the auxiliary case.

20 5. The combination of a main cable having armor-wires, and a coil connected with the main cable, a casing structure carried by the main cable, said casing structure including a main case inclosing said coil and an auxiliary case attached to and extending

outward from the main case and made in separable sections one of which is adapted
30 to be removed to give access to a splice located in the auxiliary case; a terminal cable extending from the coil in the main case into the auxiliary case, a splice between the main cable and terminal cable situated in
35 the auxiliary case and connecting the coil to the main cable; and means securing the armor-wires of the main cable to the outer end of the auxiliary case.

In testimony whereof, I have signed my
40 name to this specification in the presence of two subscribing witnesses, this 24th day of January, 1911.

JAMES CUNNINGHAM.

Witnesses:

R. S. HENDERSON,
M. R. GRESIMER.

In testimony whereof, I have signed my
name to this specification in the presence of two subscribing witnesses, this 27th day of January, 1911.

WILLIAM H. HORNER.

Witnesses:

F. L. RHODES,
G. T. BLOOD.