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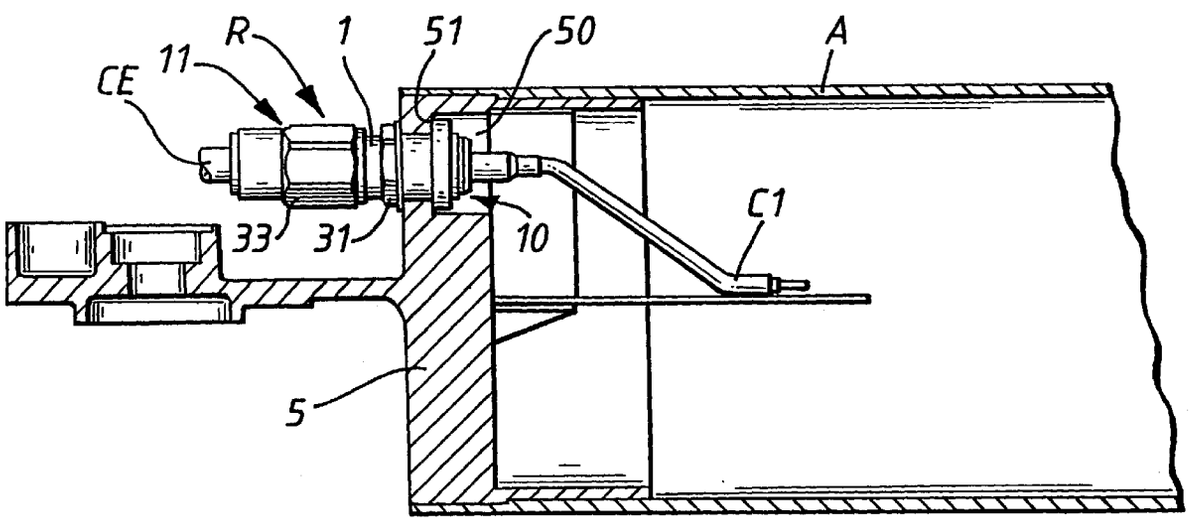
(54) Devices for the sealed connection of antennae

(57) These devices are used for connection between an internal coaxial cable (CI) forming part of the antenna and an external coaxial cable (CE).

They include a monoblock body (1) having two internal and external extremities (10, 11) for connecting the extremities of two cables, the external extremity (11) at least being provided with a packing box (33) to ensure internal imperviousness by cooperating with the outer casing of the coaxial cable.

FIG. 1



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Description

[0001] The present invention concerns the connection of an equipment item, such as an antenna, by means of a coaxial cable.

[0002] At the current moment, the connection of an antenna by an axial cable is effected with the aid of a connector with a male portion and a female portion, one being mounted directly on the antenna or even at the extremity of a coaxial cable leader. The cost price of this type of connection, by virtue of its design into two relatively complex complementary elements, is rather high, but in addition it poses several problems, including first of all a problem of imperviousness repeated at the cable inlets for the two male and female elements, as well as at the junction point of the two elements. It may be thought that to resolve the problem of imperviousness in this type of connector would be difficult and further significantly increase its cost beyond what would be acceptable. Secondly, in practice, this type of connector reveals another problem due to the fact that there is a variety of models male and female elements of which are of course not compatible with one another, which forces the final installer to permanently have available a wide range of connector elements complementary to those he is likely to encounter on antennae.

[0003] The present invention concerns finding solutions centered around these problems.

[0004] It consists of providing a new device for connecting an equipment item, such as an antenna by a coaxial cable, said device being intended for connection between an internal coaxial cable forming part of said equipment and an external coaxial cable, and is characterised in that it includes a monoblock body having two internal and external extremities for receiving and connecting the extremities to be connected of two internal and external cables, at least said external connection extremity for the external cable extremity to be connected being provided with a packing case element so as to ensure imperviousness by cooperating with the outer casing of said coaxial cable.

[0005] In one embodiment of the invention, said connector is provided to be mounted directly on said equipment, such as an antenna, in which case its internal connection extremity for the extremity of the internal cable to be connected is intended to be inside the internal volume of said equipment. To the extent that the latter is mainly sealed with respect to the outside environment, said internal connection extremity does not have to be specially equipped with a packing box element as with the other connection extremity for the external cable.

[0006] On the other hand, as the body of the connection device is then mounted traversing inside the outer casing of said equipment, such as in a bottom wall, means are provided so as to render mounting sealed.

[0007] In another embodiment of the invention, said connection device is provided to be mounted at the extremity of a coaxial cable leader coming out of said equipment, such as an antenna, and as a result the two internal and external connection extremities of said body for the internal (leader) and external cable extremities to be connected are then the same and provided identically with a packing box means.

[0008] The characteristics and advantages of the invention mentioned above and others shall appear more clearly from a reading of the following description with reference to the accompanying drawings in which :

Figure 1 is a diagrammatic partially cutaway view of a connection device according to the invention and mounted at the bottom of an antenna ;

Figure 2 is an exploded partially cutaway diagrammatic view of the various components constituting the device of figure 1 ;

Figure 3 is a diagrammatic side view of a device according to the invention and intended for connection between a cable leader and an external cable outside an antenna, and

Figure 4 is a diagrammatic view similar to figure 2 of the various components constituting the device of figure 3.

[0009] In the following description, the connection device of the invention shall be referred to as the " joining element " owing to the fact that it comprises a monolithic body with two connection extremities, as opposed to "connector" which in the present context generally denotes connection units with male and female components.

[0010] On figures 1 and 2, the joining element R is of a first type designed to be mounted directly on an antenna A. On figure 1, the base portion 5 of the antenna A includes a traversing bore 50 shouldered at 51 in which the joining piece R is mounted sealed.

[0011] The joining element R comprises a body 1 generally having a cylindrical shape (Figure 2) open axially right through between an internal connection extremity 10 (antenna side) and an external extremity 11, said connection extremities each having a crimping edge. Close to the internal extremity 10, the body 1 externally has a collar 12 whose function is to take support against the shoulder 51 of the bore 50 and immobilise there the joining element in rotation. The support side of the collar 12 moreover comprises a peripheral throat 13 for receiving a gasket 30.

[0012] From the external extremity 11 and towards the collar 12, the body 1 has an external threading 14 to receive firstly a fixing nut 31 with its locking washer 32 and a packing box lid 33.

[0013] At the level of the internal connection extremity 10, the joining element R includes conventional means for the connection at the factory of an internal coaxial cable CI to the antenna A, as shown on figure 1. As shown on figure 2, these means comprise : a washer 20 whose central orifice is intended for passage and support of the central conductor of the coaxial cable CI be-

fore its engagement in an internal connection element 21 to be described subsequently, as well as a joining piece 22 in which the cable is crimped, the joining piece itself also being crimped in the extremity 10 of the body 1.

[0014] From the external connection extremity 11, the body 1 internally has a first shoulder 15 defining the bottom of a crimping cavity, then at a distance from this first shoulder a second shoulder 16, the space between the two being intended to house an element 23 made of a semi-rigid material, such as polyethylene, intended to support said internal connection element 21. This element is a tubular clamp orientated towards the external connection extremity 11. The element 23 has the shape of a cupel at the bottom 24 of which the extremity of the clamp 21 is elastically engaged. The orifice in the bottom 24 open on the inlet of the clamp 21 is flared so as to ensure guiding of the central conductor of the external coaxial cable to be connected. Secondly, as shown on the drawing, the other extremity of the clamp 21 is held by a washer 25.

[0015] Crimped in the external connection extremity 11 is a joining piece 26 coming against the bottom of the cupel 23 and which, according to an important characteristic of the invention, comprises a tubular connection tail 27 projecting onto its base portion 26a.

[0016] The connection tail 27 defines an axial passage leading to the inlet of the clamp 21 and calibrated to the diameter of the internal dielectric part of the coaxial cable CE to be connected, as shown on figure 1. Outwardly, it has gripping reliefs, here in the form of cusps and a knurled portion. Its external inlet edge is thin, whereas the thickness of its wall increases slightly towards the end piece base 26a.

[0017] The connection tail 27 is intended to receive a prepared coaxial cable extremity having a portion of bare central conductor followed by a short portion of bare internal dielectric part. After the prepared cable extremity is engaged in the connection tail 27, the movement in the direction of introduction is continued by forcefully engaging the external casing of the cable on the connection tail until it almost touches the end piece base 26. At the end of this movement, the extremity of the cable internal dielectric has moved immediately close to the bottom of the cupel 24, whereas the portion of bare central conductor has to a sufficient extent entered the clamp 21. The outer casing of the cable is positively and solidly hooked onto the connection tail 27, crimping also ensuring contact on the connection tail of the screening or second cable conductor.

[0018] The joining element R finally includes a packing box unit at its external connection extremity 11, namely a flexible gasket 34, a washer 35, and the collet 33 being screwed onto the body 1. By being compressed inside the collet 33, the gasket 34 is forcefully pressed by its extremity against the extremity of the body 1 (beyond the internal brim of the crimping edge) and by its internal wall against the external coaxial cable casing portion engaged on the connection tail 27, thus reinforcing the mechanical hooking of the cable and stopping any humidity entering (both into the connector and the cable) via this connection extremity of the joining piece R which accordingly ensures a completely sealed connection.

[0019] In relation to the joining piece R described above, the joining piece R' of figures 3 and 4 is a double joining element in that it again comprises a monolithic body 1', but instead of the single external connection extremity, its two internal 10' and external 11' connection extremities have been designed identical so as to receive sealed an internal or leader cable CI coming out of an antenna and an external cable CE as shown on figure 3.

[0020] As shown clearly on figure 4, the means for connection to the two internal 10' and external 11' extremities are exactly the same and arranged in the same way as at the external extremity 11 of the joining piece R of figures 1 and 2, and because of this, they bear the same references and shall not be described again. It is to be noted that here the internal connection clamp 21' is a double clamp, each of its extremities being held by a cupel 23.

[0021] As for the body 1', it essentially reproduces into two and symmetrically with respect to its middle the left portion of the body 1 of the joining piece R. Beyond its extremity threadings 14', it outwardly has several flanges 12' to be used in particular for its locking in rotation when clamping the packing box collets 33.

[0022] As with the joining piece R, once connections have been carried out at the two extremities, the connection obtained with the joining piece R can guarantee imperviousness and solidity for a cost price clearly much lower than that of current connectors and offers improved convenience for users.

Claims

1. Device for connecting an equipment item, such as a coaxial cable antenna, said device being intended for connection between an internal coaxial cable (CI) forming part of said equipment and an external coaxial cable (CE) and is characterised in that it includes a monoblock body (1, 1') having two internal and external extremities (10, 11 ; 10', 11') for receiving and connecting the extremities to be connected of the two internal and external cables, at least said external connection extremity (11, 11') for the external cable extremity (CE) to be connected being provided with a packing box means to ensure imperviousness by cooperating with the outer casing of said coaxial cable.

2. Device according to claim 1, characterised in that it is provided to be mounted directly in said equipment (A) so that its internal connection extremity (10) is

inside the internal volume of said equipment (A) and in that it includes means (12, 13, 30-32) to ensure that it is seal-mounted inside said equipment.

3. Device according to claim 1, characterised in that it is provided to be mounted at the extremity of a coaxial cable leader (Cl) coming out of said equipment, the two internal and external connection extremities (10', 11') of said body (1') being arranged identically and identically provided with a packing box means.

4. Device according to one of claims 1 to 3, characterised in that said external connection extremity at least of said body (1, 1') comprises a connection tail (27) internally defining an axial passage calibrated to the diameter of the internal dielectric part of the coaxial cable, leading to an internal clamp (21, 21') for connecting the coaxial cable central conductor, and in that the connection tail (27) is outwardly shaped so as to be forcefully engaged inside the outer casing of the coaxial cable to be connected.

5. Device according to claim 4, characterised in that said connection tail (27) externally has gripping reliefs.

6. Device according to claim 4 or 5, characterised in that said connection tail (27) forms part of a joining piece (26) crimped in the corresponding extremity of the body (1, 1').

7. Device according to any one of claims 4 to 6, characterised in that said packing box means comprises a gasket (34) compressed with the aid of a bush (33) so as to forcefully be applied to firstly the outer casing portion of the coaxial cable to be connected engaged on said connection tail (27), and secondly against the corresponding extremity of said body (1, 1').

FIG. 1

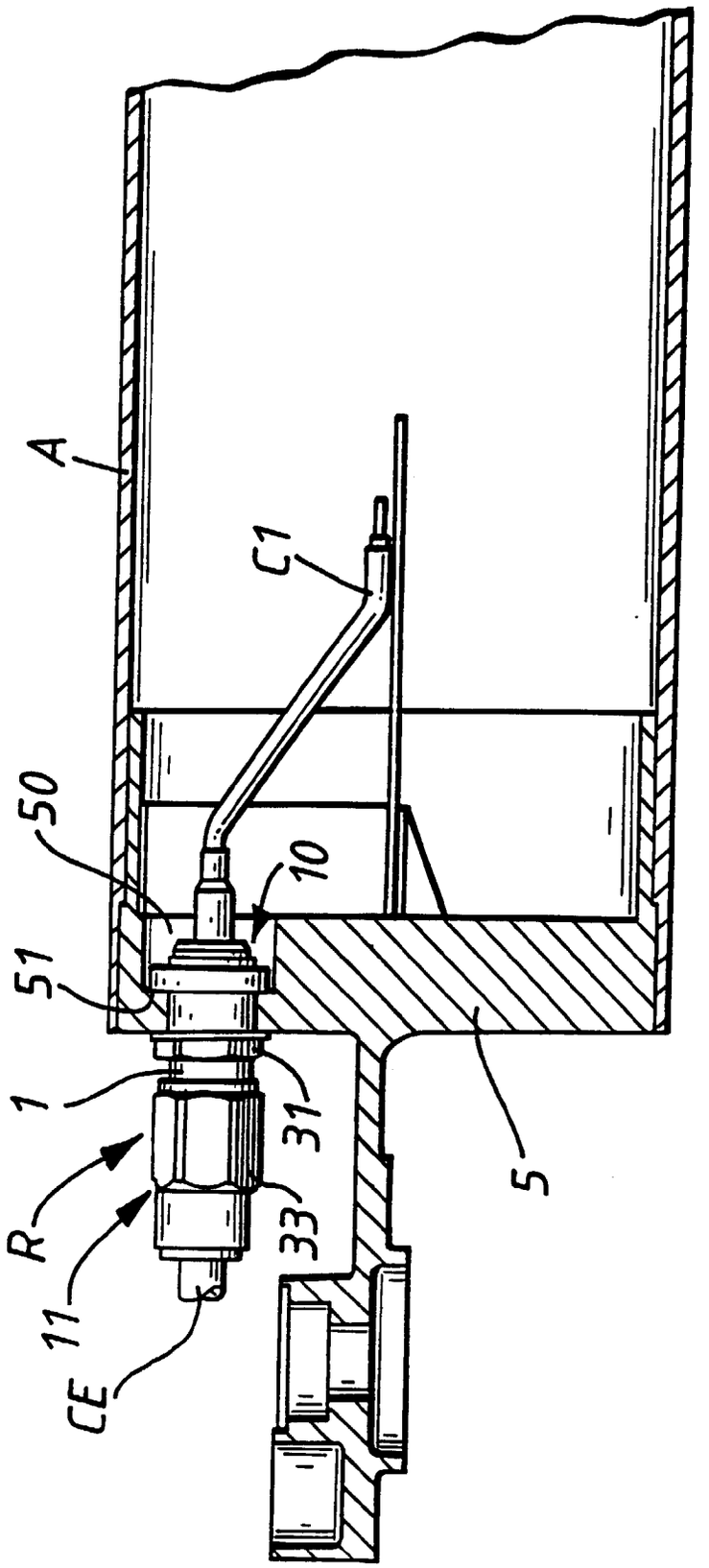


FIG. 2

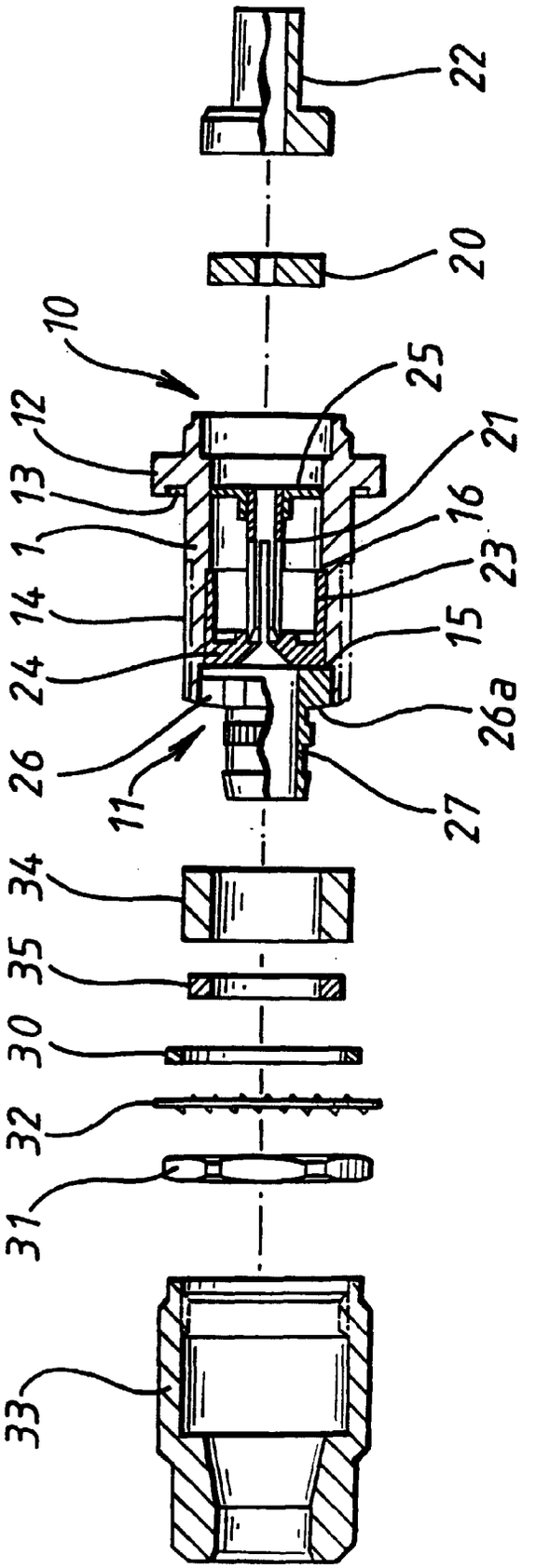


FIG. 3

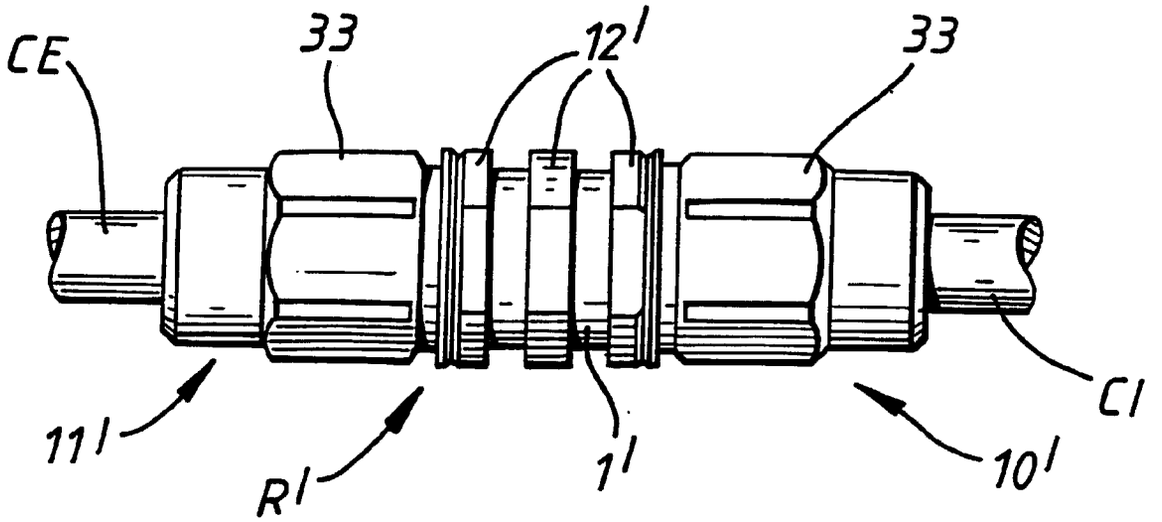
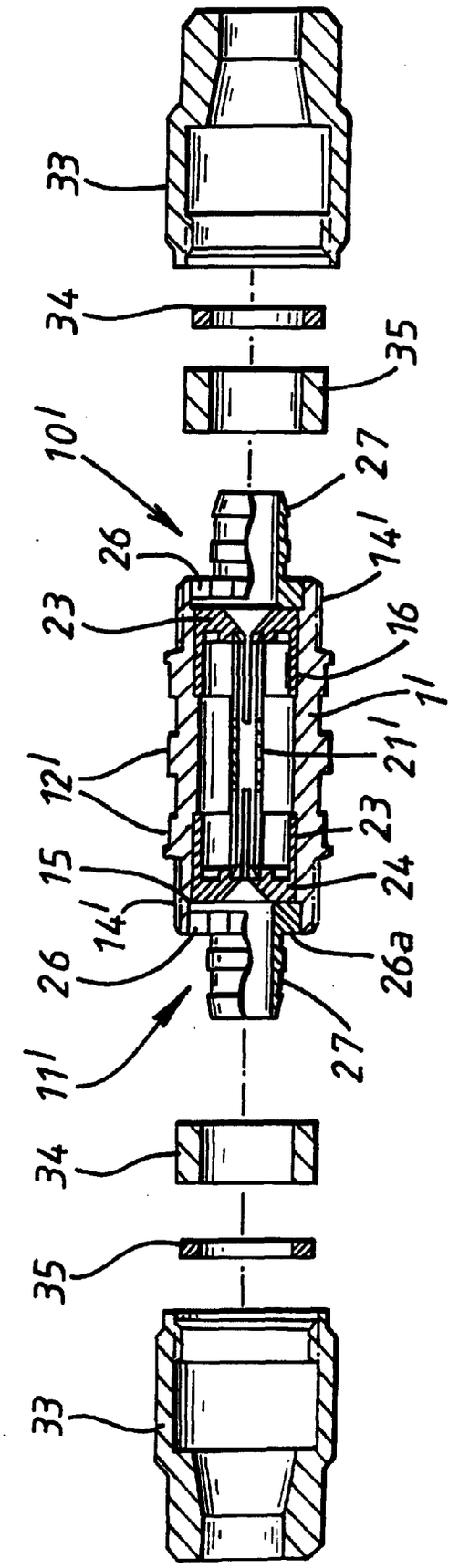


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 3487

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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TECHNICAL FIELDS SEARCHED (Int.Cl.6)
H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 August 1999	Kohler, J

CATEGORY OF CITED DOCUMENTS

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