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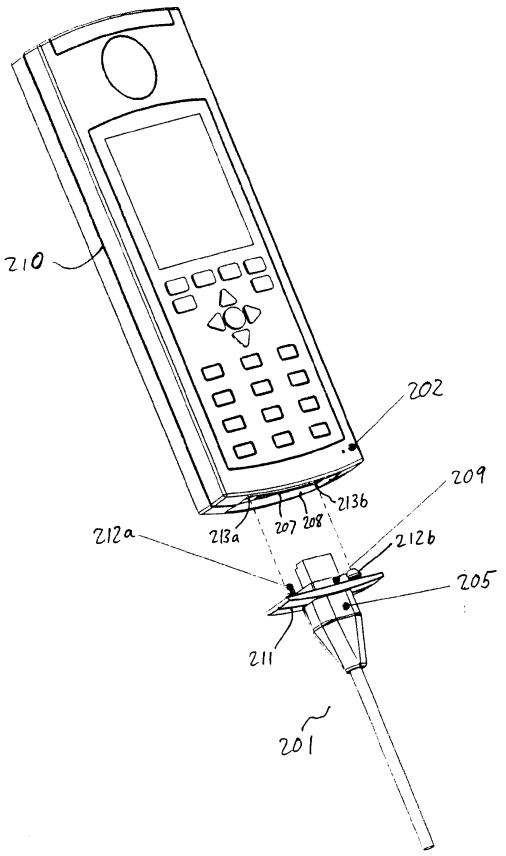
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(54) Cable plug system

(57) A cable is provided for attachment to a device having a socket, the cable comprising a plug embedded in one end of the cable; and a cable bushing having an integral flanged collar forming a sealing lip adjacent the one end of the cable. The sealing lip is configured such that, upon attachment of the plug to the socket, the plug and socket are concealed from view by the sealing lip whereby the cable has the appearance of being an integral part of the device.

Fig. 2



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Description

[0001] The present invention relates to cables and in particular, but not exclusively, to cables for attachment to patient handsets such as those used, for example, in nurse-call systems within hospitals.

[0002] Patient handsets are used in hospital wards as a means for a patient to contact the nursing staff in the event that they require attention. A patient can alert staff by depressing, for example, one or more push buttons on the handset. The handset is connected to an alert network by means of a cable. When the push button is pressed a signal is sent from the handset to the network via the cable which in turn provides an alert to the nursing staff. A common problem with conventional handsets is that patients often accidentally break off the cables that attach the handset to the nurse-call alert system of the hospital or ward. This results in high 'goodwill costs' for the manufacturer as a result of the number of units which they have to replace under warranty or guarantee.

[0003] One solution to this problem known in the art is to make the cable unlockable by fixing the cable using a separate fixing plate engaged with the cable bushing and fixed at the socket via screws or other means. This permits replacement of the cable should it need to be replaced. However, due to the secure attachment of the cable to the handset, pulling of the cable will still result in the cable becoming stretched and damaged.

[0004] An alternative solution to the problem known in the art is to have a simple plug system in which the cable has a plug at its end which can be attached or detached from the handset by pushing or pulling the plug into or out of a corresponding socket in the handset. This does not provide a good solution, however, as patients playing with the cable will be able to detach the plug easily which will typically leads to a call being automatically made to the nurse-call system. This results in a large number of false alerts being sent to the nurse-call system which is inconvenient for hospital staff. A further problem with this arrangement is that the seal is not waterproof which can lead to the device being damaged by fluid entering at the socket. In order to waterproof such a connection additional specialised sealing and fixing elements are required further increasing complexity and cost.

[0005] According to a first aspect of the invention there is provided a cable for attachment to a device having a socket, comprising a plug embedded in one end of the cable, a cable bushing having an integral flanged collar forming a sealing lip at the one end of the cable, wherein said sealing lip is configured such that, upon attachment of the plug to the socket, the plug and socket are concealed from view by the sealing lip and the cable has the appearance of being an integral part of the device.

[0006] A problem addressed by the cable is to provide a cable which is less susceptible to damage when pulled while at the same time discouraging patients from pulling at the cable.

[0007] In particular, such a cable construction ensures that the patient is less likely to play with the cable and pull it from the handset as the sealing lip (and thus the whole cable) appears to form an integral part of the handset when the plug is attached to the handset socket. A further advantage is that it requires less structural components because the sealing lip is part of the cable bushing. This means the cable can be manufactured simply and at a low cost.

[0008] Preferably, the sealing lip is accommodated by a recess provided on the device to further enhance the appearance of the handset and cable in a single unitary item.

[0009] It should be noted that by 'plug' and 'socket' it is meant power or data connectors adapted to mate with one another. For example, the plug may include one or more connection pins adapted to meet with corresponding contact pads or recesses provided in the socket. However these could equally be arranged in reverse, with the socket including connection pins and the plug having appropriate contact pads. The connectors could be electrical or otherwise (e.g. fibre optic).

[0010] In one embodiment of the invention the sealing lip forms a waterproof seal at the point of connection between the plug and the socket. The sealing lip therefore has the additional advantage of providing a means to waterproof the connection and therefore protect it from damage caused by liquids. Preferably the sealing lip comprises elastic material and said waterproof seal is provided by compression fit of the sealing lip into a recess on the handset containing the socket. Thus, the waterproof seal does not require any further material components only that the sealing lip is formed at least partially of elastic material.

[0011] In preferred embodiments the sealing lip further comprises a resilient engagement element adapted to secure the cable to the device. Thus, advantageously the cable is securely attached to the housing of the handset but will release from the handset if pulled with sufficient strength without causing substantial damage to the cable. This can be implemented in a number of ways. In some preferred examples, the resilient engagement element comprises a receiving recess arranged to resiliently engage a corresponding snap provided in the recess or socket of the device, to thereby secure the cable to the device. Alternatively, it may be preferred that the resilient engagement element comprises at least one snap adapted to resiliently engage a corresponding feature on the device, to thereby secure the cable to the device. In particularly preferred cases, said resilient engagement element comprises an edge of the sealing lip. Thus in one embodiment the snap and the sealing element comprise a single element. This has the further advantage of structural simplicity and provides an elegant and cost effective way to secure the cable utilising the sealing lip while retaining the concealment function.

[0012] According to a second aspect of the present invention there is provided a device comprising a recess and a socket located within said recess wherein said

socket and recess are adapted to receive a cable for attachment to a device having a socket, comprising a plug embedded in one end of the cable, a cable bushing having an integral flanged collar forming a sealing lip at the one end of the cable, wherein said sealing lip is configured such that, upon attachment of the plug to the socket, the plug and socket are concealed from view by the sealing lip and the cable has the appearance of being an integral part of the device.

[0013] According to a further aspect of the present invention there is provided a cable plug system comprising a cable for attachment to a device having a socket, comprising a plug embedded in one end of the cable, a cable bushing having an integral flanged collar forming a sealing lip at the one end of the cable, wherein said sealing lip is configured such that, upon attachment of the plug to the socket, the plug and socket are concealed from view by the sealing lip and the cable has the appearance of being an integral part of the device, and a device adapted to receive said cable.

[0014] Embodiments of the present invention will now be described and contrasted with conventional cable plug systems with reference to the following drawings:

Figures 1A and 1B show a cable known in the prior art which is attached to the handset by separate components;

Figure 2 shows a cable and patient handset in a first embodiment of the present invention; and

Figure 3 shows a cable and patient handset in a second embodiment of the present invention wherein a sealing lip and snap comprise a single functional element.

[0015] Figure 1A shows a prior art cable 101 and patient handset 102 system wherein the cable is secured to the handset by means of a fixing plate 103 and screws 104a and 104b. The cable itself comprises cable bushing 105 at one end of the cable 101 in which a plug 106 is embedded. The plug 106 is configured to fit into a socket 107 provided in a recess 108 having dimensions substantially corresponding to those of the fixing plate located in the bottom of the housing of the patient handset 102. In use the fixing plate 103 is fitted over the plug 6 and sits flush to the cable bushing 105. Holes 103a and 103b are provided in the fixing plate located on both sides of the cable bushing having a diameter large enough to receive the screws 104a and 104b. Corresponding screw holes 108a and 108b are provided in the recess 108 arranged so as to be aligned with the holes 103a and 103b in the fixing plate when the cable 101 is attached to the handset 102. Attachment is performed by pushing the plug 106 into the socket 107 such that the fixing plate 103 is pushed into the recess 108. The cable is secured by inserting screws 104a and 104b through the corresponding holes 103a and 103b in the fixing plate and screwing them into the screw holes 108a and 108b provided in the recess 108. As shown in Figure 1B the fixing plate is held in place by using a flange 109 formed at the end of the cable bushing 105 that preferably forms part of the cable bushing 105 itself. In use the fixing plate sits behind the flange 109 such that when the fixing plate 103 is attached to the handset the fixing plate 103 will press against the flange 109 towards the handset 102 thereby holding the cable 101 in place.

[0016] The prior art arrangement permits secure attachment of the plug 1 to the handset 2 which prevents the cable being inadvertently or deliberately removed from the handset by a patient. The known arrangement suffers from the disadvantage that the cable can become damaged by a patient playing or pulling at it while it is attached. However, it permits removal of the plug from the handset by removing the screws 4a and 4b which may be useful when it is required to replace the cable should it become damaged.

[0017] Turning now to figure 2, a cable 201 and handset 202 system according to an embodiment of the present invention is shown. The cable 201 has cable bushing 205 at one end within which a plug 206 is embedded. Typically the plug will include one or more electrical connection pins corresponding to wires carried by the cable or could include other data or power connectors such as fibre optic couplers. Like the prior art system, the plug 206 is configured to fit into a socket 207 provided in a recess 208 located in the bottom of the housing of the patient handset 202. The socket includes corresponding data or power connectors adapted to connect to those of the plug. In contrast to the prior art cable, the cable bushing 205 further comprises an integral flanged collar around the plug which forms a sealing lip 209. In addition, the sealing lip has snaps 212a and 212b provided on both sides of the plug 206 wherein the snaps are structurally formed as part of the cable bushing 205. Thus, the cable bushing around the plug, the sealing lip and the snaps 212a and 212b can all be formed from a single piece of material. This makes the cable plug system cheap and easy to manufacture.

[0018] The sealing lip 209 is configured so as to fits flush into the recess 208 when the plug 206 is connected to the socket 207 and is shaped so as to match the surface profile and appearance of the surrounding housing. For example, in Figure 2 the handset housing has a groove 210 which runs around the perimeter of the housing and the sealing lip 209 has a matching groove 211 such that when the sealing lip is sitting in the recess 208 it appears that the groove is continuous up to the cable bushing 205 surrounding the plug 206. When the sealing lip is engaged within the recess 208 the snaps are pressed into corresponding holes 213a and 213b located within the recess 208 and hold the cable in place. Thus, when the cable is attached to the handset 202 the plug 206 is hidden from view by the sealing lip and further, because of the matched appearance of the sealing lip 209 to the housing it appears to a user that the cable 201

is an integral part of the handset. This discourages patients from playing or pulling at the interface between the cable 201 and the handset 202, therefore reducing the likelihood of the cable 201 being detached and a false nurse call being relayed to the alert system. In the event that the cable needs to be detached it can be removed by applying enough force to release the snaps 212a and 212b from their respective apertures 213a and 213b. It will be appreciated, however, that the cable may be formed without the snaps and instead rely on the coupling between the plug and socket to hold it in place or alternatively other means can be used to secure the sealing lip to the handset.

[0019] The sealing lip 209 is preferably made at least partly of an elastic material such that the sealing lip 209 forms a waterproof seal at the recess 208 to protect the plug 206 and socket 207. Having a waterproof seal is particularly advantageous for apparatus used in a hospital environment where spilled fluids are a likely cause of damage to equipment. This arrangement has the further advantage in that no additional parts are need to form the seal, thus, providing a simple and cost effective way of providing a waterproof seal.

[0020] A second embodiment of the present invention is shown in Figure 3. In this embodiment there is a single snap 312 which is formed around the perimeter of the sealing lip 309 of the cable 301. In this example, the sealing lip 309 does not extend very far beyond the edge of the cable bushing 305 containing the plug 306 and thus the snap 312 is able to engage with the entire recess 308 at the bottom of the handset 302 to provide a secure fastening of the cable 301 to the handset 302 when the plug 306 is inserted into the socket 307.

[0021] The cable in the above described embodiments is described as having a snap or snaps which engage with corresponding recesses or holes 213a or 213b in the recess 208 on the device containing the socket 207. However, it is also envisaged that in alternative embodiments the device itself could have a snap or snaps provided in the recess containing the socket and the cable comprises recesses arranged to engage with the snaps in the socket recess when the cable plug is pressed into the socket.

[0022] Although the cable is described in the above embodiments as being for attachment to a patient handset the invention is equally applicable to any medical device requiring a cable connection and in particular to medical devices with which a patient will have ready access and to other domestic or industrial devices where there is a risk of a user accidentally or deliberately interfering with the cable.

Claims

1. A cable for attachment to a device having a socket, comprising:

a plug embedded in one end of the cable; and
a cable bushing having an integral flanged collar forming a sealing lip adjacent the one end of the cable;
wherein said sealing lip is configured such that, upon attachment of the plug to the socket, the plug and socket are concealed from view by the sealing lip whereby the cable has the appearance of being an integral part of the device.

2. A cable according to claim 1 wherein in use the sealing lip forms a waterproof seal around the point of connection between the plug and the socket.

3. A cable according to claim 2 wherein the sealing lip comprises elastic material and said waterproof seal is provided by a compression fit of the sealing lip into a recess on the device containing the socket.

4. A cable according to any preceding claim wherein the sealing lip further comprises a resilient engagement element adapted to resiliently engage a corresponding feature on the device, to thereby secure the cable to the device.

5. A cable according to claim 4 wherein the resilient engagement element comprises a receiving recess arranged to resiliently engage a corresponding snap provided in the recess or socket of the device, to thereby secure the cable to the device.

6. A cable according to claim 4 wherein the resilient engagement element comprises at least one snap adapted to resiliently engage a corresponding feature on the device, to thereby secure the cable to the device.

7. A cable according to any of claims 4 to 6 wherein said resilient engagement element comprises an edge of the sealing lip.

8. A device comprising a recess and a socket located within said recess adapted to receive a cable according to any of claims 1 to 7.

9. A device according to claim 8 wherein said device is a medical device.

10. A device according to claim 8 wherein said device is a patient handset.

11. A cable plug system comprising a cable according to any of claims 1 to 7 and a device according to any of claims 8 to 10.

Fig. 1A

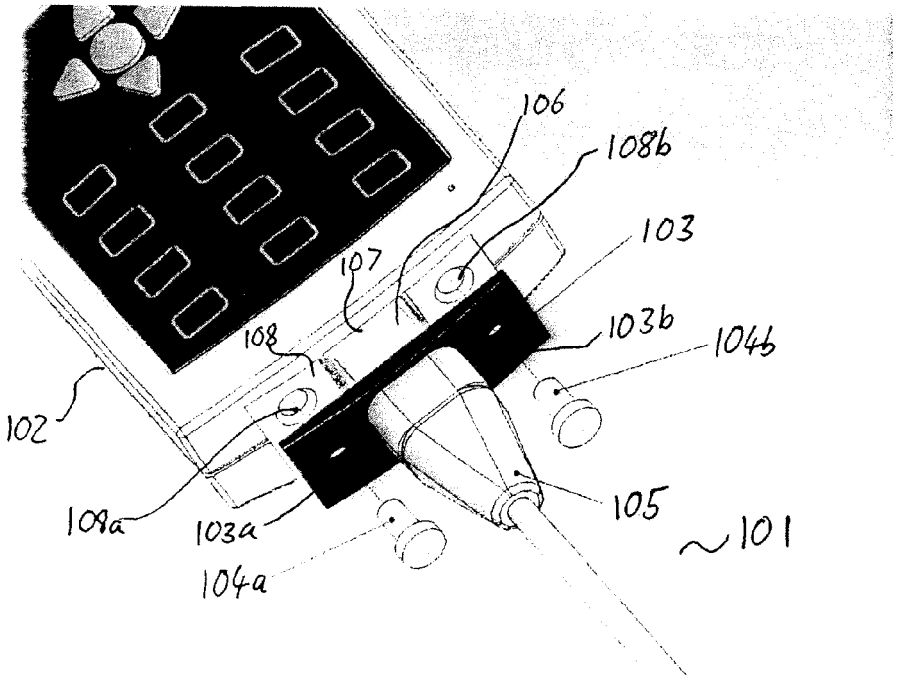

106
108b
103
107
108
103b
104b
102
109a
103a
105
101
104a

Fig. 1B

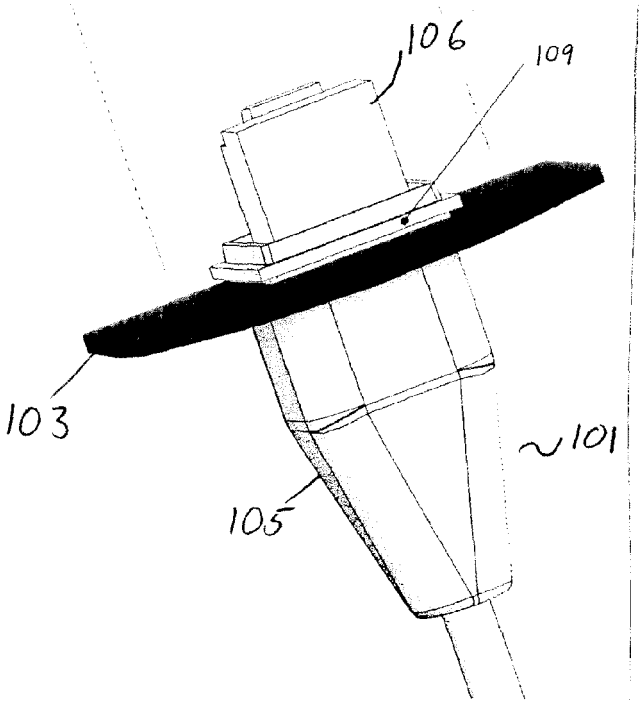
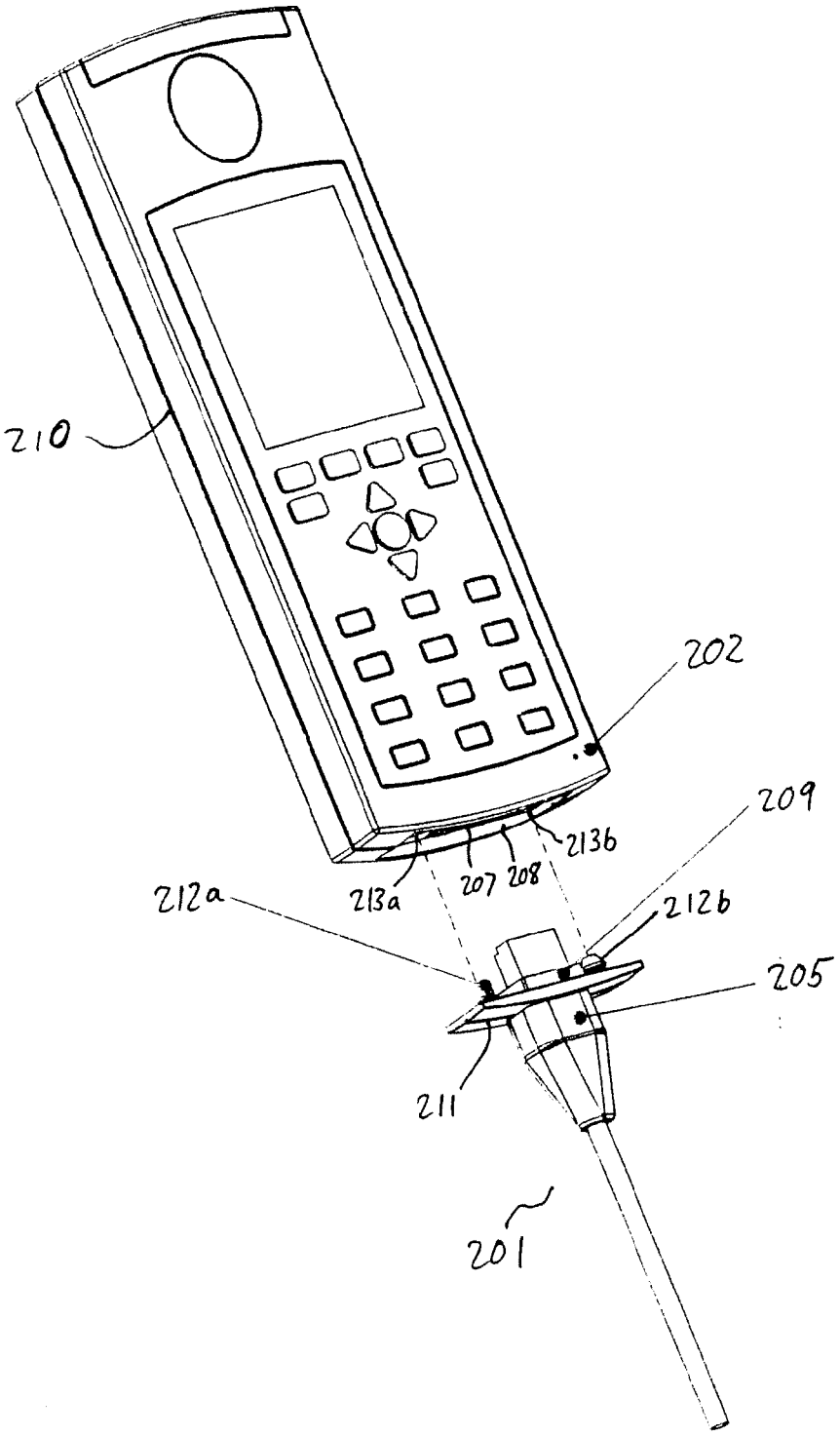

106
109
103
101
105

Fig. 2



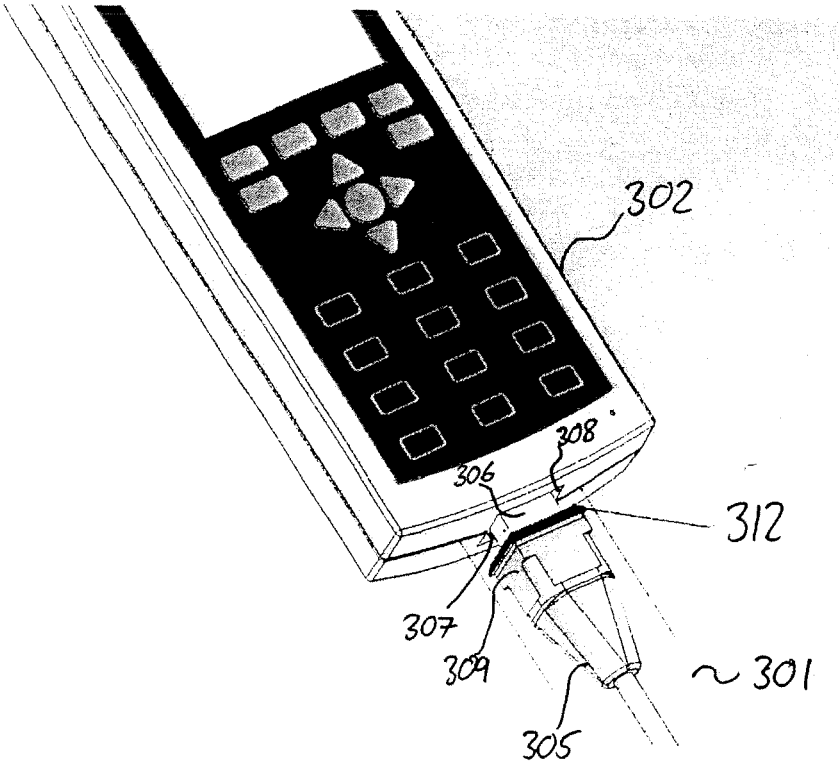


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 09 17 4931

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 March 2010	Jiménez, Jesús

CATEGORY OF CITED DOCUMENTS

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