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Mayer

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[54] **WALL PLUG**

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[51] **Int. Cl.**[2] **E04G 3/00**

[58] **Field of Search** ..... 248/209, 71, 216, 232, 248/233, 234; 85/74, 76, 28, 9 R

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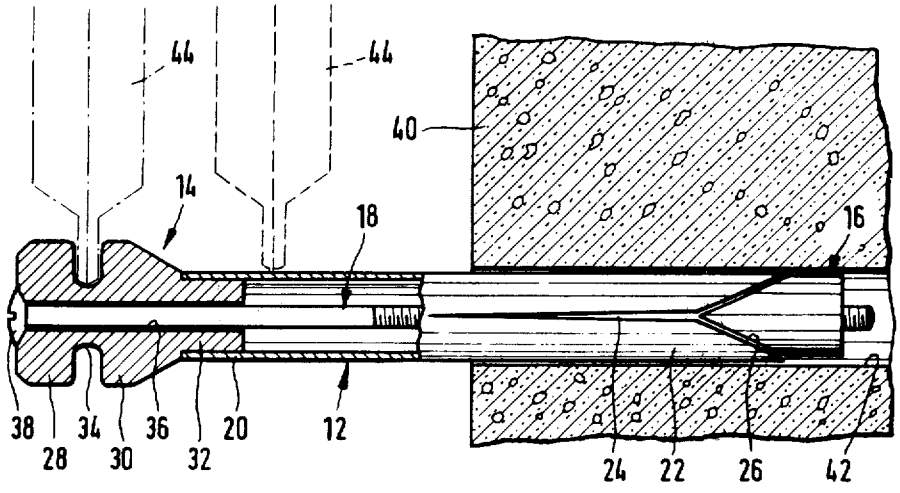
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[57] **ABSTRACT**

A wall plug for supporting an object alongside a wall having a sleeve member with a wedge member on the end inserted in the wall, a supporting member with tapered shape and a circumferential slot within which the object is supported for the opposite end, and a screw member connecting the members on each of the ends of the plug.

6 Claims, 4 Drawing Figures



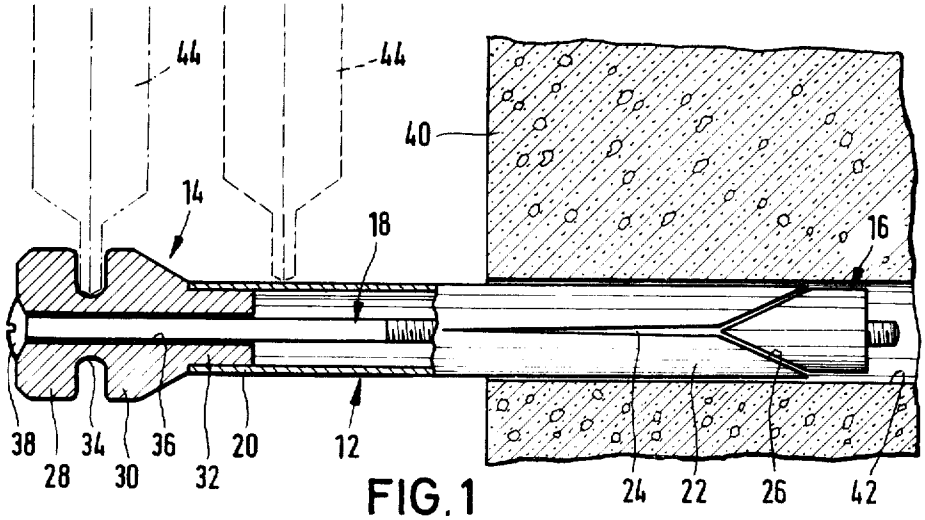


FIG. 1

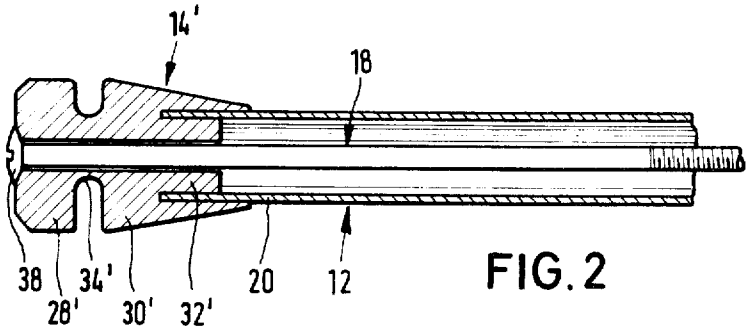


FIG. 2

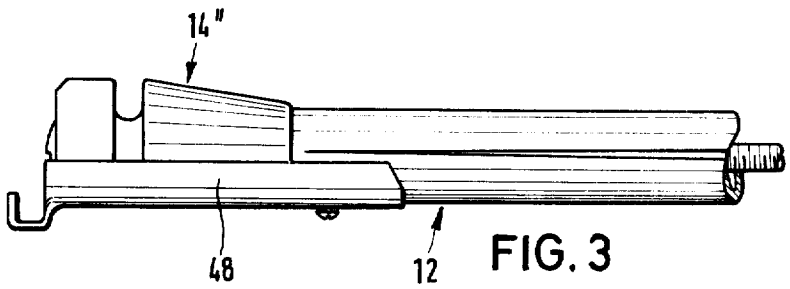


FIG. 3

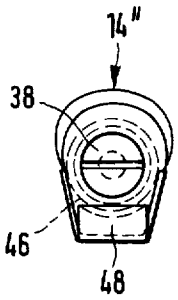


FIG. 4

WALL PLUG

This invention relates to wall plugs for supporting objects such as radiators, or the like, of the kind comprising a sleeve member having a front end portion and a longitudinally slotted rear end portion for insertion into a borehole of a wall, a supporting member adjacent the front end portion of said sleeve member, having an at least partly circumferential slot for accommodating an edge or the like of said object, a wedge member adjacent the rear end portion of said sleeve member, having a wedge shaped or conical surface for penetrating and expanding said sleeve member, and a screw member extending axially through said sleeve member and interconnecting said supporting member and said wedge member.

Wall plugs of this type are known wherein the supporting member is cylindrical and equal in diameter to the sleeve member. Owing to this configuration, it is possible to insert a wall plug of the kind described into a borehole of a wall up to the middle of its total length, for example, and then to place a radiator or similar heavy object on the portion of the sleeve member projecting from the wall and to secure the radiator or some other object with additional securing means known in the art, retaining it in its position such that it extends at a certain distance from the wall, for example in parallel thereto. Subsequently, the wall plug is pushed further into said borehole, or hammered into it, for example, while a lower edge of the radiator or other object originally resting on the sleeve member slides from the sleeve member to the supporting member and engages the circumferential slot of the supporting member. Finally, the rear end portion of the sleeve member is expanded in that either the screw member itself or a nut disposed at the front end portion of the screw member in front of the supporting member and bolted to the screw member is turned, causing the screw member to draw the wedge member into the rear end portion of said sleeve member.

It is desirable to provide as deep a circumferential slot as possible so that the radiator or other object to be supported by the wall plug is actually securely supported in the circumferential slot. On the other hand, it is desirable to use a sleeve member whose diameter is not unnecessarily large, for the greater the diameter of the sleeve member, the greater the hole required in the wall, of course, as well as the energy spent when drilling the hole. Moreover, the price of a wall plug of the type described is raised considerably with the increasing diameter of the sleeve member. At a given diameter of the sleeve member, with known wall plugs, the depth of the circumferential slot of the supporting member is very limited especially when the supporting member is not the head of the screw member at the same time, but is provided with an axial through bore through which the screw member extends.

In accordance with the invention, a wall plug of the kind described is improved in that the supporting member has a first portion substantially greater in diameter than the sleeve member and a second portion separated from said first portion by said slot and tapering in rearward direction so as to attain a rear diameter substantially equal to the diameter of said sleeve member.

The maximum diameter of the supporting member according to the invention, which is large in proportion to the external diameter of the sleeve member, allows

to dispose a circumferential or partly circumferential slot of great radial depth at the supporting member in which the radiator or the like is securely supported. The afore-mentioned second portion of the supporting member is conical or wedge-shaped and forms some kind of ramp. Thus, the radiator or other object, having first been placed on the sleeve member, during the mounting operation, when the wall plug is driven into the wall can slide up to the highest point of the supporting member, whereafter it engages the slot.

Other features and advantages of the invention will become apparent from the following description of three embodiments of the invention illustrated in the drawings, wherein:

FIG. 1 is a fragmentary sectional view in axial direction of a first embodiment of the wall plug;

FIG. 2 is an axial sectional view of the front end portion of a second embodiment of the wall plug;

FIG. 3 is a side elevation of the front end portion of a third embodiment of the wall plug; and

FIG. 4 is a front elevation of the wall plug shown in FIG. 3.

The main elements of the wall plug illustrated in FIG. 1 are a sleeve member **12**, a supporting member **14**, a wedge member **16** and a screw member **18**.

The sleeve member **12** is made of sheet metal, for example galvanized sheet steel, and has a front end portion **20** as well as a rear end portion **22**. The rear end portion **22** is provided with at least one longitudinal slot **24**; the illustrated embodiment is provided with two such slots diametrically opposed. The slots **24** extend from the apex of a triangular recess **26** each disposed at the rear end portion **22** and end about midway of the total length of said sleeve member **12**.

The supporting member **14** consists of plastic material, such as polyamide, and comprises a first portion **28**, a second portion **30** and a third portion **32**. The first portion **28** is substantially cylindrical and is considerably greater in diameter than said sleeve member **12**. The second portion **30** has the same diameter as the first portion **28** only in the area of its front end and tapers in rearward direction in the manner of a frustum whose small base has a diameter identical with the external diameter of the sleeve member **12**. The third portion **32** of the supporting member **14** extends from the small base of the second portion **30** axially in rearward direction and snugly engages the front end portion **20** of the said sleeve member **12**. The first portion **28** is separated from the second portion **30** by a circumferential slot **34**. An axial through bore **36** extends through the entire supporting member **14**.

The wedge member **16** is substantially cylindrical and has an external diameter which is just as great or only slightly smaller than that of the sleeve member **12**. The front section of the wedge member **16** is wedge-shaped and engages the recesses **26** at the rear end portion **22** of the sleeve member **12** which prevents it from rotating with respect to the sleeve member **12**. Alternatively, the front section of the wedge member **16** may be a frustum and the recesses **26** may be omitted. A taphole axially extends through the wedge member **16**.

The screw member **18** extends through the through bore **36** of the supporting member **14** and is screwed into the taphole of the wedge member **16**. In the embodiment illustrated, the screw member **18** comprises at its front end portion a lenticular head **38** integral with said screw member, said head being accommo-

dated in a corresponding indentation of the first portion 28 of the supporting member 14. However, just as at its rear end portion, the screw member 18 could be provided with a thread at its front end portion, onto which thread a nut replacing the head 38 may be screwed. It is also possible for the screw member 18 to be integral with the supporting member 14. In this case, the supporting member 14, just as the screw member 18, is preferably made of steel or another metal alloy; the supporting member itself forming the head of the screw member 18.

The wall plug described, in the state illustrated in FIG. 1, can easily be inserted in a hole 42 drilled in a wall 40, the diameter of said hole 42 being somewhat greater than the outer diameter of the sleeve member 12. When about half the length of the sleeve member 12 has entered the hole 42, a radiator 44 or some other object to be fastened to the wall 40 is placed on the portion of the sleeve member 12 projecting from the wall 40, as indicated in broken lines in FIG. 1. The radiator 44 is then connected to the wall 40 with the aid of additional securing means (not illustrated) such as screws in such a manner that the space desired between the radiator 44 and the wall 40 can be determined while the radiator can still be moved perpendicularly. Subsequently, the wall plug is pressed or hammered deeper into the borehole 42. The lower edge of the radiator 44 then slides from the sleeve member 12 and onto the frusto-conical second portion 30 of the supporting member 14 in upward direction until it engages the slot 34, as indicated in dash-dotted lines in FIG. 1.

In the wall plug shown in FIG. 2, the sleeve member 12, the wedge member 16 and the screw member 18 are no different from the corresponding parts in FIG. 1. What is different is only the configuration of the supporting member which, for this reason, is designated 14' as a whole in FIG. 2. The individual parts of the supporting member 14' are numbered in the same manner as the corresponding parts of the supporting member 14 in FIG. 1, but are also indexed, of course.

The first portion 28' in FIG. 2 is identical with the first portion 28 in FIG. 1. However, in contrast to the circumferential slot 34, the circumferential slot 34' is disposed excentrically. The second portion 30' of the supporting member 14' has a smaller angle of opening and accordingly extends further back than the second portion 30 of the supporting member 14. Instead of the third portion 32 provided in line with FIG. 2, a lug 32' is provided in FIG. 3 extending from the bottom of an axial recess of the second portion 30' in rearward direction. Just as the third portion 32 in FIG. 1, the lug 32' engages the front end portion 20 of the sleeve member 18 substantially free from play; another difference in comparison with FIG. 1 is, though, that the sleeve member 18 as such extends into the second portion 30'. This is a particularly safe way of preventing that the supporting member 14' tilts with respect to the supporting member 14'. The supporting member 14', however, is adapted to be rotatable with respect to the sleeve member 12 so that, owing to the excentricity of the slot 34', the height of a radiator 44 whose lower edge has engaged the slot 34', may be adjusted by turning the supporting member 14'.

The wall plug illustrated in FIGS. 3 and 4 is only differentiated from the one shown in FIG. 1 in that the supporting member designated 14'' there, has a partly cylindrical underside 46 being in alignment with the circumferential surface of the sleeve member 12. Thus it is possible to secure a partly cylindrical additional retaining member 48 at the underside of the wall plug. The additional retaining member 48 is provided for giving additional support to certain types of radiator or for mounting additional apparatus, such as heat measuring devices.

What I claim is:

1. A wall plug for supporting objects, such as radiators or the like, comprising

a sleeve member having a front end portion and a longitudinally slotted rear end portion for insertion into a borehole of a wall,

a supporting member mounted adjacent the front end portion of said sleeve member, having an at least partly circumferential slot for accommodating an edge or the like of said object,

a wedge member adjacent the rear end portion of said sleeve member, having a wedge-shaped or conical surface for penetrating and expanding said sleeve member, and

a screw member extending axially through said sleeve member and interconnecting said supporting member and said wedge member in which said supporting member has a first portion substantially greater in diameter than said sleeve member and a second portion separated from said first portion by said slot and tapering in rearward direction so as to attain a rear diameter substantially equal to the diameter of said sleeve member, the tapering part of said second portion forming a sliding surface over which the object being supported can move into the slot in said supporting member.

2. A wall plug as in claim 1 in which said supporting member has a third portion extending axially away in rearward direction from said second portion and engaging the front end portion of said sleeve member.

3. A wall plug as in claim 1 in which the second portion of said supporting member has an axial recess accommodating the front end portion of said sleeve member.

4. A wall plug as in claim 1 in which the second portion of said supporting member has an axial recess accommodating the front end portion of said sleeve member, a lug extending axially away in rearward direction from the bottom of said recess and engaging the front end portion of said sleeve member.

5. A wall plug as in claim 1 in which the bottom of said circumferential slot in said supporting member is eccentrical with respect to the common longitudinal axis of said sleeve member and said screw member.

6. A wall plug as in claim 1 in which said supporting member has a partly cylindrical underside being in alignment with the circumferential surface of said sleeve member.

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