

PATENT SPECIFICATION

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DRAWINGS ATTACHED



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(54) WALL PLUG

(71) I, ARTUR FISCHER, a German citizen, of Tumlingen, Kreis Freudenstadt, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a wall plug, more especially of synthetic plastics material, for the detachable mounting of building components to masonry or the like.

When securing a building component to masonry, the mounted component does not always make direct surface contact with the masonry on which it is to be mounted. In the case of sky-scraper buildings, for example, it has become the practice to provide the walls with facing elements spaced apart from the masonry. In this so-called detached mounting of facing elements, the desired spacing can be achieved by the interposition of suitable spacing elements between the facing elements and the masonry. However, this method has not proved effective, owing to the need for additional fixing components and the increased time necessary to carry it out.

To overcome these disadvantages, special bolts were produced by means of which the facing elements can be anchored to the masonry and, at the same time, be mounted in spaced relation thereto by means of wall plugs, using a method of so-called "plug-through" mounting. In this method a bolt is used having two threads of different diameter. One of the threads serves for connection with a plug anchored in the masonry, whereas the other thread, located at the head of the bolt, connects with the facing element to be mounted. This latter thread at the bolt head has a diameter somewhat larger than the maximum outer diameter of the plug. "Plug-through" mounting is effected by first inserting the bolt in the plug, giving it at first only a few turns to ensure a connection with the plug. Then, the bolt and plug are together slipped through a hole in the facing element which

is aligned with a hole drilled in the masonry to accommodate the plug, until the thread provided at the bolt head is enabled to engage the hole in the facing element. The length of the bolt is such that, in this position, the plug completely penetrates the hole drilled therefor in the masonry. When the bolt is now screwed home, the thread arranged at the leading end of the bolt enters the plug and expands it, whereas the thread at the bolt head at the same time penetrates the material of the facing element. In this way, a satisfactory connection between facing element and masonry can be achieved with predetermined spacing.

The methods of "plug-through" mounting suffer from the common disadvantage that, while spacing of the facing element at a predetermined distance from the masonry is possible, any variation of this distance that may become necessary in order to compensate for irregularities may prove very difficult, because as soon as the thread provided at the head of the bolt engages the facing element, the distance thereof from the masonry is fixed and can only be altered with difficulty. During the initial screwing home of the bolt, the plug can still be shifted slightly in the hole drilled in the masonry. A tightening continues, however, the expansion of the plug increases to such an extent that its displacement in the drilled hole is no longer possible. Moreover, manufacturing a bolt with two different threads has the disadvantage of additional cost, especially as these are non-standard bolts and cannot be used for other purposes.

The present invention provides a wall plug for securing a building component to masonry, the plug comprising an expansible end portion and a shank portion provided with stop means for locating and supporting a building component, the plug having a longitudinal bore tapering towards its expansible end portion and the plug being such that its expansible end portion is positionable in a hole in masonry and is expandible into anchoring engagement therewith by

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means of an expansion element introduced into its bore, the shank portion being arranged, in use, to project from the hole so that a building component is securable in spaced relation to the masonry between opposed surfaces of the stop means and the shank portion. By means of the plug according to the invention, components to be mounted can be fastened at a distance from the masonry without the necessity for special screws or bolts.

In one preferred embodiment the stop means comprises a member longitudinally displaceable on the shank portion. Advantageously the shank portion is externally threaded, the said longitudinally displaceable member comprising a mating screw threaded nut.

When a building component is to be mounted, first the plug of the invention is introduced into a hole drilled in the masonry. The stop means provided on the shank portion of the plug is spaced apart from the end of the plug by a distance corresponding to the thickness of a given building component to be mounted. Then the building component, which is provided with a hole to engage the shank portion of the plug, is slipped on the plug until it bears on the stop means. The stop means need not be a longitudinally displaceable member, for example it may be constituted by projections arranged on the circumference of the shank portion, which projections permit the plug to be slipped through the hole of the component and are capable of yielding resiliently. All that has to be done now, in order to complete the mounting operation, is to drive in a suitable expanding element, so as to expand the end of the plug projecting into the bore in the masonry. Such an expanding element may simply be a fastening screw or bolt of standard dimensions with a metric or wood screw thread. The mounted component is clamped between the stop means arranged on the shank portion of the plug and the head of the fastening screw or bolt and is thus fixed at the desired spacing from the masonry. A variation of the distance between this component and the masonry during assembly, for the purpose of compensating for irregularities etc., can be effected simply by suitably displacing the plug in the masonry hole before expansion of the plug. The only condition is that the hole in the masonry should be deep enough to allow a displacement of the plug further into the hole. There is no need for additional special elements such as special fastening screws, for example, when a plug according to the invention is used. To provide a thread, for example, integrally with the shank portion of the plug is by no means difficult or lengthy, especially in the case of plugs produced from

synthetic material, because these threads may be formed integrally with the plugs during their manufacture in an injection-moulding process.

Finally, there is no need for any anti-corrosion protection for the screw or bolt serving as the expanding element because it is arranged to be surrounded by the plug over its entire length.

Preferably, the shank portion is provided with a widened head portion, the arrangement being such that a building component can be secured between the head portion and the longitudinally displaceable member. In this case the plug serves as a fixing means for the mounted component not only in the direction towards the masonry, but also in the opposite direction. Clamping of the mounted component between the plug head portion and the stop means is in this case effected by suitable adjustment of the longitudinally displaceable member constituting the stop means. The expansion of the plug does not in this case require a fastening screw: a cylindrical pin, conically tapered at one end, would be quite satisfactory.

The invention is illustrated by way of example in the accompanying drawing, the single figure of which is an elevation, partly in section, of a plug according to the invention shown in place in masonry.

Referring to the drawing, masonry 1 is provided with a hole 2 and a component 3 is to be mounted in spaced relation to the masonry. The component 3 has a hole 4 which is aligned with the hole 2 in the masonry 1. A plug 5 is introduced into the hole 2 in the masonry 1, the plug being provided with a longitudinal slot 7 at the end portion 6 penetrating the hole 2. In the region of the longitudinal slot 7 the plug has notches 8 between teeth 9. These teeth and notches serve to improve the anchorage of the plug in the masonry 1. The other end portion of the plug, opposite the end portion 6, comprises a shank portion 10 which projects from the hole 2 and engages the mounted component 3. The plug has a longitudinal bore 11 which starts at the end of the shank portion 10 and is conically tapered towards the slotted end portion 6. This conical shape is not visible in the drawing, because an expanding element 12 has already been introduced into the plug. In the region of the component 3 the shank portion has a thread 13 on which is screwed a stop means 14 in the form of an internally threaded nut. At the end of the shank portion is a conically widened head portion 15 fitting into a corresponding recess of the component 3. The mounted component is clamped between the stop means 14 and the head portion 15 and is thus fastened at a predetermined distance from the masonry 1. The expanding element 12 may be a bolt

provided, for example, with a wood screw thread.

WHAT I CLAIM IS:—

1. A wall plug for securing a building component to masonry, the plug comprising an expansible end portion and a shank portion provided with stop means for locating and supporting a building component, the plug having a longitudinal bore tapering towards its expansible end portion and the plug being such that its expansible end portion is positionable in a hole in masonry and is expandible into anchoring engagement therewith by means of an expansion element introduced into its bore, the shank portion being arranged, in use, to project from the hole so that a building component is securable in spaced relation to the masonry between opposed surfaces of the stop means and the shank portion.

2. A plug as claimed in claim 1, in which the stop means comprises a member longi-

tudinally displaceable on the shank portion.

3. A plug as claimed in claim 2, in which the shank portion is externally threaded, the said longitudinally displaceable member comprising a mating screw threaded nut.

4. A plug as claimed in claim 2 or 3, in which the shank portion has a widened head portion, the arrangement being such that a building component can be secured between the head portion and the longitudinally displaceable member.

5. A plug as claimed in any one of claims 1—4, formed of synthetic plastics material.

6. A wall plug substantially as hereinbefore described with reference to, and as illustrated by, the accompanying drawing.

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