Aug. 13, 1963 G. T. PHILLIPS 3,100,517

FASTENING DEVICES FOR SECURING ACCESSORIES TO CONCRETE AND THE LIKE

Original Filed Jan. 13, 1956

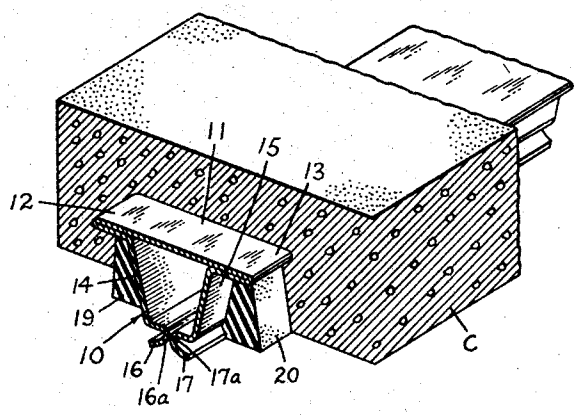


FIG.1.

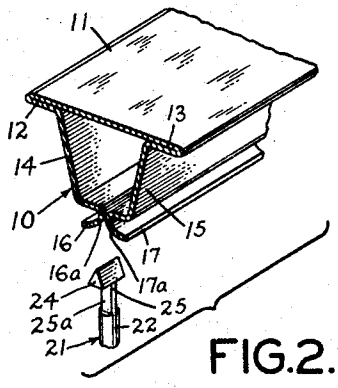


FIG.2.

FIG.3.

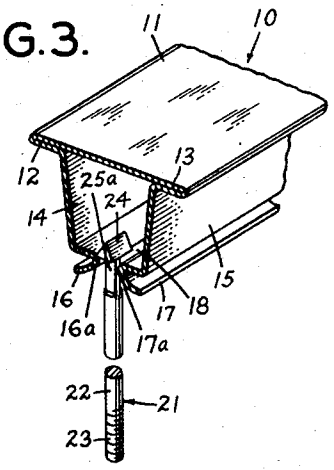


FIG.5.

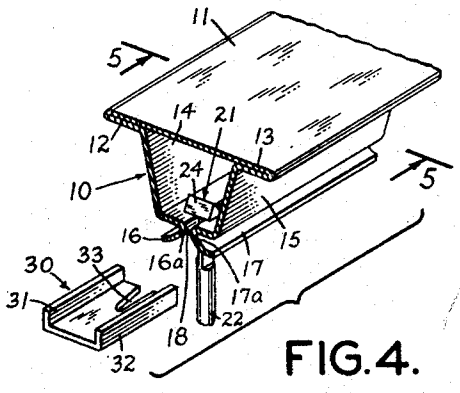
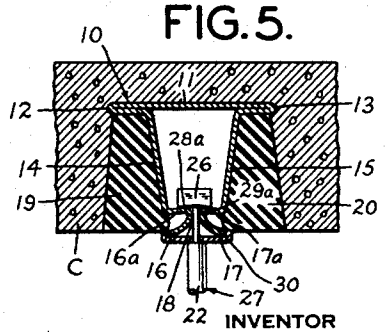


FIG.4.



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FASTENING DEVICES FOR SECURING ACCESSORIES TO CONCRETE AND THE LIKE

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Original application Jan. 13, 1956, Ser. No. 565,005, now Patent No. 2,909,054, dated Oct. 20, 1959. Divided and this application July 14, 1959, Ser. No. 827,112
3 Claims. (Cl. 151—68)

This invention relates to improvements in fastening devices for anchoring or securing building accessories to building structures and it relates more particularly to a headed fastening device for use with structural strip members which can be mounted in the walls, ceilings, floors or the like of buildings by means of which such building accessories as light fixtures, conduits, pipes, outlet boxes and the like may be supported.

This is a division of my application Serial No. 565,005, filed January 13, 1956, now Patent No. 2,909,054, granted October 20, 1959, which is a continuation-in-part of my U.S. application Ser. No. 547,949, filed Nov. 21, 1955, now abandoned.

Heretofore, when it is desired to suspend building accessories from the walls or ceilings of a building structure formed of masonry materials, it is necessary to drill or otherwise form holes in the building structure for expansion anchors or the like to receive screws to anchor the accessories to the structure. Oftentimes it is found that the ceiling or wall already has a pipe or conduit concealed therein at the zone in which the anchors are to be located so that the anchor-receiving holes either cannot be drilled at the place required or the workman damages the conduit or pipe when drilling into the wall or ceiling.

The present invention provides an effective means for overcoming the difficulties encountered with the supporting devices heretofore used. The new supporting structure includes, metallic strip members which can be mounted in a wall, floor, ceiling or other part of a building structure during the construction of the same so that the strips become an integral part of the building structure. Each of the strips has an outwardly opening slot extending throughout its length to receive a headed fastening element embodying the present invention, which can be driven into the slot and gripped by the strip to retain the fastening element in the slot. Inasmuch as the slot runs the length of the fastening unit, any number of the new fastening devices in any desired spaced relation can be mounted in each strip thereby permitting lighting fixtures, pipes, conduits and other building accessories to be mounted in almost any desired position or location.

In order to facilitate the use of the fastening and supporting devices, they may be provided with portions which enable the gripping portions of the strip to separate as the fastening devices are inserted into the slot and then to contract thereby to grip and support the fastening devices in such position that they cannot be removed readily or dislodged by vibration or any reasonable application of force thereto. This arrangement assures a strong connection between the fastening devices and the channel strips and a positive and firm support for the accessories.

For a better understanding of the present invention, reference may be had to the accompanying drawing in which:

FIGURE 1 is a perspective view of a portion of one of the channel strips embedded in a concrete element such as a section of concrete ceiling;

FIGURE 2 is an exploded perspective view of a typical channel strip and a headed fastener embodying the invention for engagement therewith;

FIGURE 3 is a similar perspective view of the channel strip and headed fastener showing the relation of the parts at the time the head of the fastener has just entered the channel strip;

FIGURE 4 is a perspective view of a portion of the channel strip with the headed fastener inserted therein and illustrating a clip for anchoring the fastener in the channel strip; and

FIG. 5 is a view in section taken on line 5—5 of FIGURE 4 showing the assembly of the channel strip, headed fastener and clip in a masonry structure.

FIGURES 1 to 5 show a novel channel strip by means of which the invention can be practiced. The channel strip is formed of thin, springy, sheet metal, such as sheet steel. The channel strip **10** has a flat head portion **11** provided with reversely bent edge portions forming oppositely directed flanges **12** and **13** at the upper edge of the strip. The flange portions **12** and **13** merge into side panels **14** and **15** which converge inwardly and terminate in inwardly and reversely outwardly curved flanges **16** and **17** extending lengthwise of the strip. As illustrated in FIGURE 5, the flanges **16** and **17** may have inner surface portions **16***a* and **17***a* which converge upwardly slightly on opposite sides of the slot **18** between them which runs the full length of the strip **10**.

In use, one or more channel strips **10** may be supported at the bottom of the mold form for casting a concrete ceiling or the like. On opposite sides of the side flanges **14** and **15** of the channel are mounted elongated strips **19** and **20** formed of natural or synthetic rubber or other resilient and compressible material. The concrete C may then be cast on the mold form so that the channel strip **10** and its adjacent rubber strips **19** and **20** are embedded in the concrete when the latter has set. The presence of the rubber strips **19** and **20** permits the side panels **14** and **15** of the channel strips to be spread apart slightly for a purpose to be described.

Inasmuch as the channel units are disposed with their slotted sides at the surface of the concrete structure C, and the open sides thereof are protected by the shape of the flanges **16** and **17**, the concrete cannot flow into the hollow interior of the strip. If the strips **10** are so located in the building structure that concrete might flow into the gap **18** of the strip, the gap can be covered by means of a removable tape applied to the flanges **16** and **17** during pouring of the concrete, the tape being removed after the concrete has hardened and the mold form removed.

In order to secure building accessories, such as lights, conduits, pipes and the like, to the building structure, headed fastening elements **21** of the type embodying the invention and disclosed generally in FIGURES 2 to 5 of the drawing are provided. Each fastening element may be an elongated rod or bolt **22** having a threaded end portion **23** and an enlarged generally wedge-shaped head **24** thereon at its opposite end. The configuration of the head **24** is not important so long as it has a narrow outer edge or end and is generally wedge-shaped so that it can be driven into the gap **18** between flanges **16** and **17** to allow the head to pass into the hollow interior of the channel strip **10**. The rubber strips **19** and **20** allow the flanges **16** and **17** to spread apart as the head is inserted and also aid in springing them back together to grip the portion of the fastener element **21** behind the head. The neck portion **25** of the fastening element **21** directly adjacent to the head **24** may have its opposite sides flattened as at **25***a* and is somewhat narrower than the diameter of the bolt portion **22**. Moreover, the flats **25***a* on the fastener are disposed at an angle to the enlarged head **24** so that when the flanges **16** and **17** of the strip spring back against the flats, the fastener **21** will be rotated to dispose the head **24** at an angle to the slot **18**.

In this position the head **24** overlies the flanges **16** and **17** and resists withdrawal from the channel unit.

A most secure type of connection is obtained with the structure shown in FIGURE wherein the head **26** of the threaded fastening element **27** is disposed at a right angle to the flats **28***a* and **29***a* on opposite sides of the fastening element and the lower surface of the head **26** is undercut at opposite sides to conform to the upwardly converging surfaces **16***a* and **17***a* of the flanges. This arrangement requires the fastening element **27** to be lifted as it is rotated in order to disengage the head from the flanges **16** and **17**, an action which is unlikely to be caused by vibration when the device is used as a supporting element.

In order to preclude any possible rotation of the anchoring element **21** or **27** after it has been attached to the channel strip, I provide a generally channel-shaped clip **30** having edge flanges **31** and **32** to engage on opposite sides of the lower free edges of the reversely bent flanges **16** and **17** and having an elongated notch **33** to engage flats **25***a*, **28***a*, **29***a* of the fastening elements. The clip **30** prevents rotation of the fastening element relative to the channel strip so that disengagement of these elements is effectively prevented.

It will be understood that the channel strips, when mounted in the ceiling of a structure, may be covered with a protective strip and may be concealed by plaster or the like on the ceiling or wall. However, if it is desired to attach an accessory such as a light bracket, the plaster can be opened at a point overlying the strip and fastening elements **21** are driven into the exposed channel portion to securely anchor the element in place.

Moreover, the size of the channel strips and the fastening elements can be varied depending upon the service conditions under which they are used. For example, when they are mounted in office buildings or the like where the accessories are light in weight, the channel strips may be on the order of an inch deep or smaller. On the other hand, when used in industrial establishments for supporting pulleys, machinery and the like, the channel strips may be made much larger and of much heavier material commensurate with the load to be supported.

The presence of the channel strips in a concrete ceiling or the like does not adversely affect the strength of the ceiling inasmuch as the channel strips in themselves will be in the nature of reinforcements for the concrete. Therefore, the channel strips more than compensate for the concrete displaced by the channel strips.

Inasmuch as the anchoring or supporting devices embodying the present invention are susceptible to considerable modification in size, shape and proportions, the forms of the invention described herein should be considered as illustrative and not as limiting the scope of the following claims.

I claim:

1. A fastening device for securing accessories to a building structure comprising a member having an elongated shank and a head at one end thereof, said head being shaped substantially like a wedge of greater length than and a width substantially the same as the greatest cross-sectional dimension of said shank and having long head surfaces inclined and meeting to form a straight sharp edge substantially at right angles to the shank axis, the ends of said edge and head extending laterally on opposite sides of said shank, said shank having means thereon for connecting it to said accessory and a neck portion of rectangular cross section adjacent to said head and within the periphery of said shank, said neck portion being of smaller cross section than the portions of said head and said shank adjacent thereto.

2. The fastening element set forth in claim 1 in which said rectangular neck portion has its long dimension disposed at substantially a right angle to the long dimension of said head.

3. The fastening element set forth in claim 1 in which the laterally extending ends of said head have rear surfaces inclined inwardly and toward said edge from their outer ends.

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