

Aug. 7, 1951

W. S. MILES

2,563,479

PANEL SECURING DEVICE

Filed June 17, 1948

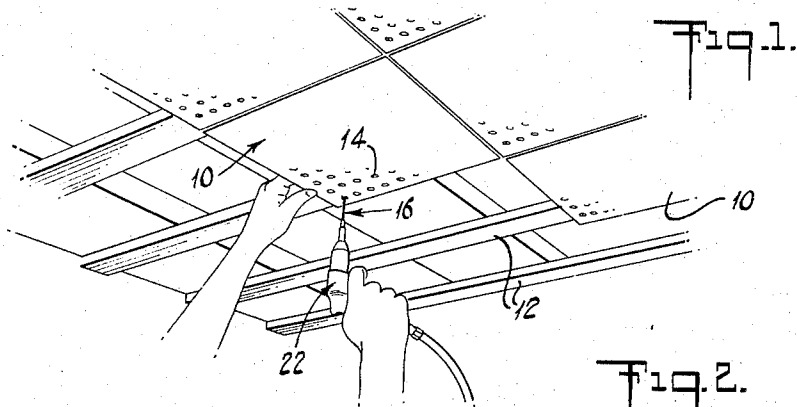


Fig. 2.

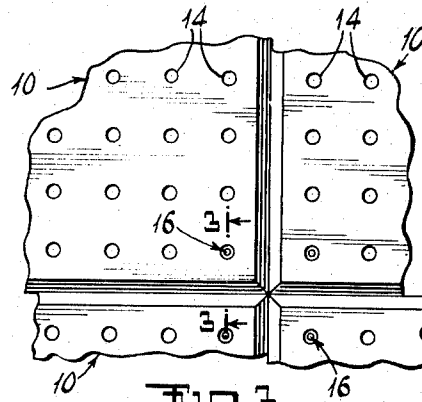


Fig. 3.

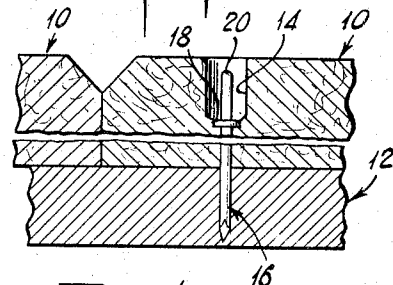


Fig. 4.

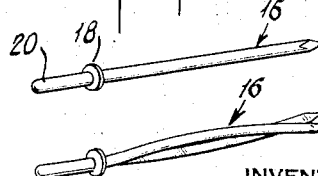


Fig. 7.



Fig. 5.

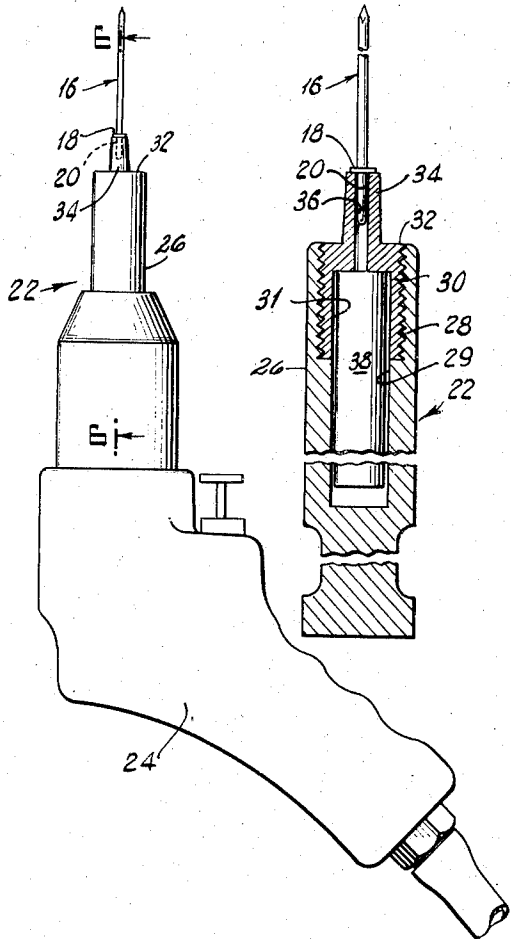
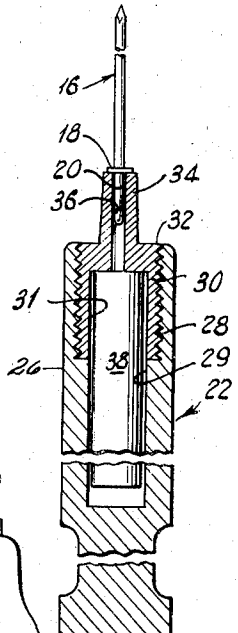


Fig. 6.



INVENTOR
WILLIAM S. MILES.
BY *Nirgil O. Kline*
ATTORNEY

UNITED STATES PATENT OFFICE

2,563,479

PANEL SECURING DEVICE

William S. Miles, Hastings on Hudson, N. Y., assignor to Johns-Manville Corporation, New York, N. Y., a corporation of New York

Application June 17, 1948, Serial No. 33,500

8 Claims. (Cl. 1-47)

1

The instant invention relates to an improved apparatus for securing building members to a supporting structure. Members of the type with which applicant is particularly concerned are fibrous acoustical panels which have a plurality of preformed, tubular recesses or perforations extending inwardly from the exposed faces and part way through the panels to permit the entry of airborne sound to the interior structure, and the invention will be specifically described in this connection. It will be appreciated, however, that it may also be employed with other panels or members where similar fastening problems are involved.

Panels of the type referred to are conventionally secured to the supporting base wall or other structure either by cementing or by mechanical fasteners, such as nails or screws. Where the latter expedient is employed, fasteners are driven into the perforations adjacent the corners of the panels, whereby their heads are more or less concealed. Cementing has the serious disadvantage that, particularly after a period of time, the cement tends to relax its grip and it is frequently found that a number of ceiling panels, for example, will become loosened and drop out of alignment or fall completely from the ceiling. Mechanical fastening devices overcome this disadvantage but present problems of their own due to the relatively soft, readily destructible character of the panels combined with the necessity of bringing the heads of the fasteners into holding contact with the bottom of the recesses. The difficulty of performing the nailing or screwing operation at economical speeds and with conventional tools without injury to the panels will be readily apparent.

The instant invention has for its principal object the provision of an improved method and apparatus for mechanically securing panels of the type referred to, the method and apparatus greatly facilitating installation of the panels and minimizing the possibility of their injury. More particularly an object of the invention is to provide a device and method of driving fasteners of the type of nails into selected recesses of the panel by supporting the fastener in a hammer head including a tip adapted to enter the recess or perforation and subjecting the head to vibration or reciprocation to drive the head of the fastener into firm engagement with the panel at the bottom of the recess.

An apparatus or tool in accordance with the instant invention includes a vibrating or reciprocating hammer of generally conventional type

2

modified in accordance with the instant invention to have a head including a tubular tip extending from its forward face, the tip being of a length equal approximately to the depth of the recesses. A nail is employed of a type having a head or collar intermediate the length of the shank to define a rearwardly projecting stem to be received within the hollow tip with the head resting against the end of the tip. In operation and in carrying out the method, the fastener is first placed in the tool, as mentioned above, and the end of the fastener is then inserted in a selected recess of a panel temporarily held in position against the base structure. The hammer is then operated to drive the nail by the vibrating or reciprocating movement of the hammer head. During the driving operation the fastener is held in an erect position relatively to the hammer head, due to the fact that the stem is confined in the hollow interior of the tip. As driving is continued, the tip enters the recess of the panel and moves forwardly until the head or collar of the fastener is in firm holding contact with the material at the bottom of the recess.

The process and apparatus permit rapid erection with a minimum risk of injury to the panels. The entire operation may be performed by a single workman and at high speed.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description of a preferred embodiment of the invention which is to follow, and to the accompanying drawings in which:

Fig. 1 is a perspective view illustrating the method of the instant invention;

Fig. 2 is a fragmentary plan view of applied panels;

Fig. 3 is a sectional view on an enlarged scale, taken on the line 3-3 of Fig. 2;

Fig. 4 is a perspective view of a fastener employed in the instant invention.

Fig. 5 is an elevational view of a tool incorporating the invention ready for operation, with a fastener mounted therein;

Fig. 6 is a sectional view, on an enlarged scale, taken on the line 6-6 of Fig. 5; and

Fig. 7 is a view similar to Fig. 4 illustrating a modified fastener.

Referring now to the drawings, the instant invention is illustrated as employed in conjunction with the installation of a ceiling consisting of a plurality of panels 10 secured in contiguous relationship on furring strips 12 or other nail receiving, supporting medium. The panels shown

3

are of a type conventionally used for acoustical correction purposes, namely, fiberboard panels having a plurality of sound entry recesses or perforations 14 extending inwardly from the exposed face to a predetermined depth to permit the entry of airborne sound to the relatively porous, interior structure. The panels are secured in position by fasteners 16 as shown in Fig. 4, which are driven through the perforations located in the corners of the panels, the nails extending through the unperforated thickness of the material and into the furring strips. Generally the corner perforations are somewhat shallower than the others so that they may be of the same depth and still leave an adequate thickness of material for receiving the nails in both thick and thin panels.

Nail or fastener 16, as illustrated in Figs. 4 and 7, consists of an elongated shank having a pointed forward end, and a collar or head 18 intermediate the ends of the shank and relatively adjacent one end to define a rearwardly projecting stem 20. Fig. 4 illustrates a type of nail particularly adapted to be driven into wooden furring strips or other supports while the fastener of Fig. 7, comprising a split, spreadable shank, is applicable where the backing structure is a softer material such as gypsum board. When the fastener is driven home, as illustrated in Figs. 2 and 3, head 18 is in contact with the bottom of the perforation 14 and the end of stem 20 is preferably somewhat below the outer surface of the panel. Due to the relatively small diameter of the stem and the fact that it is, in effect, countersunk within the perforation, it does not detract from the appearance of the ceiling.

The apparatus or tool employed to drive the nails is indicated generally by the reference character 22 (see Figs. 1, 5 and 6) and comprises a hammer 24 which may be of either the pneumatic or electrically driven type, a pneumatic hammer being shown, adapted to impart rapid vertical reciprocating or vibrating movements to a head 26. Such hammers, with ordinary nail driving heads, are standard equipment and may be purchased on the market and no specific description of them is given. In accordance with the instant invention the hammer head which may be substituted for the regular head, is of special construction. It includes a central, cylindrical recess extending inwardly from the forward face of the head, the recess including an outer, threaded section 28 and an inner section 29 of reduced diameter. A plug 30 is threaded into section 28, the plug having a recess 31 in line with recess 29. The plug and end of the head define an annular face 32. Projecting outwardly from the head and in axial alignment therewith, is a tip 34, preferably integrally connected with the plug 30, the tip being of a length approximately the same as, but preferably slightly greater than, the depth of recesses or perforations 14 which are to receive the fasteners. For example, where the perforation in the panel is approximately $\frac{1}{4}$ " in depth, the tip would be, say, $\frac{5}{16}$ " in length. Tip 34 has an axial bore 36 extending to recess 29. The maximum outer diameter of the tip, which may be slightly tapered as shown, is of approximately the diameter of perforations 14 whereby the tip may be readily received within the perforations. Bore 36 is of a diameter to readily receive the stem 20 of a fastener 16.

A magnet 38 adapted to set up a magnetic field is mounted within the elongated space de-

4

fined by recesses 29 and 31. The head 26 and preferably plug 30 are made of non-magnetic or relatively non-magnetic, stainless steels, such as those of austenitic classification whereby the magnet is shielded except at the bore 36.

In the operation of the device and in carrying out the method of the instant invention, a fastener 16 is mounted in the head by inserting stem 20 within bore 36. The magnetic field set up by magnet 38 and concentrated in bore 36 facilitates the insertion of the fastener and retains it against accidental displacement, irrespective of the position in which the gun may be held in the further preparatory operations. A panel 10 is laid in proper position on the furring strips or other backing and is temporarily held, suitably by the free hand of the applicator. He then inserts the point of the fastener into the selected perforation and operates the hammer, the repeated impacts or vibrations applied to the hammer head by the pneumatic or electrical drive causing the nail to be driven forwardly through the material at the base of the perforation and into the furring strip. As will be readily understood, it is essential that the nail be driven home to bring the head or collar 18 into firm binding engagement with the material of the panel at the bottom of the perforation and to preferably, at least partially embed the head in the material as illustrated in Fig. 3. However, due to the readily compressible and destructible nature of the panel material, care must be taken not to drive the fastener too far. In the instant invention the applicator is notified when the fastener is in the desired position partially by the somewhat increased resistance to driving when the head is forced into the material at the bottom of the perforation, but also by the approach of face 32 to the face of the tile. That is, when the face 32 comes into contact or approximate contact with the panel, the applicator will know that the fastener is completely driven.

The device is simple in construction and operation. The fastener, held in position in tip 34, may be easily and quickly inserted into the selected perforation and from that point on the operation of driving the fastener is substantially automatic. Inasmuch as the tool is manipulated entirely by one hand, the other hand is left free to hold the panel in place while the initial fastener is being driven.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. In an apparatus for securing members having preformed recesses to a support by headed fasteners including rearwardly projecting stems, a hammer head including a flat face and a tip projecting therefrom, said tip being of an outer diameter to be received within said recesses and having an axial bore of a diameter to receive said stem, and means for reciprocating said head at high frequencies and in a direction to drive said fastener.

2. In an apparatus for securing panels having preformed recesses to a support by headed fasteners including rearwardly projecting stems, a hammer head having a flat face and a tip projecting therefrom, said tip being of an outer

5

diameter to be received within said recesses and having an axial bore of a diameter to receive said stem, means for setting up a magnetic field within said tip to retain a fastener within said bore against accidental displacement, and means for reciprocating said head at relatively high frequencies and in a direction to drive said fastener.

3. In an apparatus for securing panels having preformed recesses to a support by headed fasteners including rearwardly projecting stems, a hammer head having a flat face and a tip projecting therefrom, said tip being of an outer diameter to be received within said recesses and of a length slightly greater than the depth of said recesses and having an axial bore of a diameter to receive said stem, and means for reciprocating said head at relatively high frequencies and in a direction to drive said fastener.

4. In an apparatus for securing panels having preformed recesses to a support by headed fasteners including rearwardly projecting stems, a hammer head having a hollow interior portion, a tip projecting from said head, said tip being of an outer diameter to be received within said recesses and having an axial bore of a diameter to receive said stem, said bore extending to said hollow interior portion, a magnet within said hollow interior portion to set up a magnetic field within said bore to retain the fastener against accidental displacement, and means for reciprocating said head at relatively high frequencies and in a direction to drive said fastener.

5. In an apparatus for securing panels having preformed recesses to a support by headed fasteners having stems projecting rearwardly from the head thereof, a tubular hammer head having a forward face, a magnet within said tubular hammer head, said head including a closure plug defining a part of said face and having a tip projecting therefrom, said tip being of an outer diameter to be received within said recesses and having an axial bore of a diameter to receive said stem, and means for reciprocating said head at high frequencies and in a direction to drive said fastener.

6

6. In an apparatus for driving fasteners including a rearwardly projecting stem, a hammer head having a flat forward face and a hollow tip projecting therefrom and adapted to receive the stem of a fastener, and means for reciprocating said head at high frequencies and in a direction to drive said fastener.

7. In an apparatus for driving a fastener including a rearwardly projecting stem, a hammer head having a hollow interior portion, a tip projecting from said head and having an axial bore of a diameter to receive the stem of the fastener, said bore extending to said hollow interior portion, means to set up a magnetic field within said bore, and means for reciprocating said head at relatively high frequencies and in a direction to drive said fastener.

8. In an apparatus for driving a fastener including a rearwardly projecting stem, a tubular hammer head having a flat forward face, said head including a closure plug defining a part of said face and having a tip projecting therefrom, said tip having an axial bore of a diameter to receive the stem of the fastener, and means for reciprocating said head at relatively high frequencies and in a direction to drive said fastener.

WILLIAM S. MILES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
847,888	Birdsall	Mar. 19, 1907
1,164,086	Gooding	Dec. 14, 1915
1,185,190	Fitzgerald	May 30, 1916
1,699,519	Brown	Jan. 22, 1929
1,856,336	Hysing	May 3, 1932

FOREIGN PATENTS

Number	Country	Date
18,697	Great Britain	Nov. 19, 1890

45