

Aug. 14, 1934.

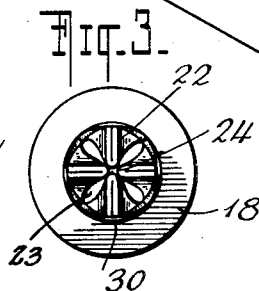
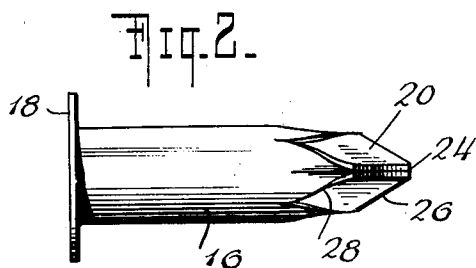
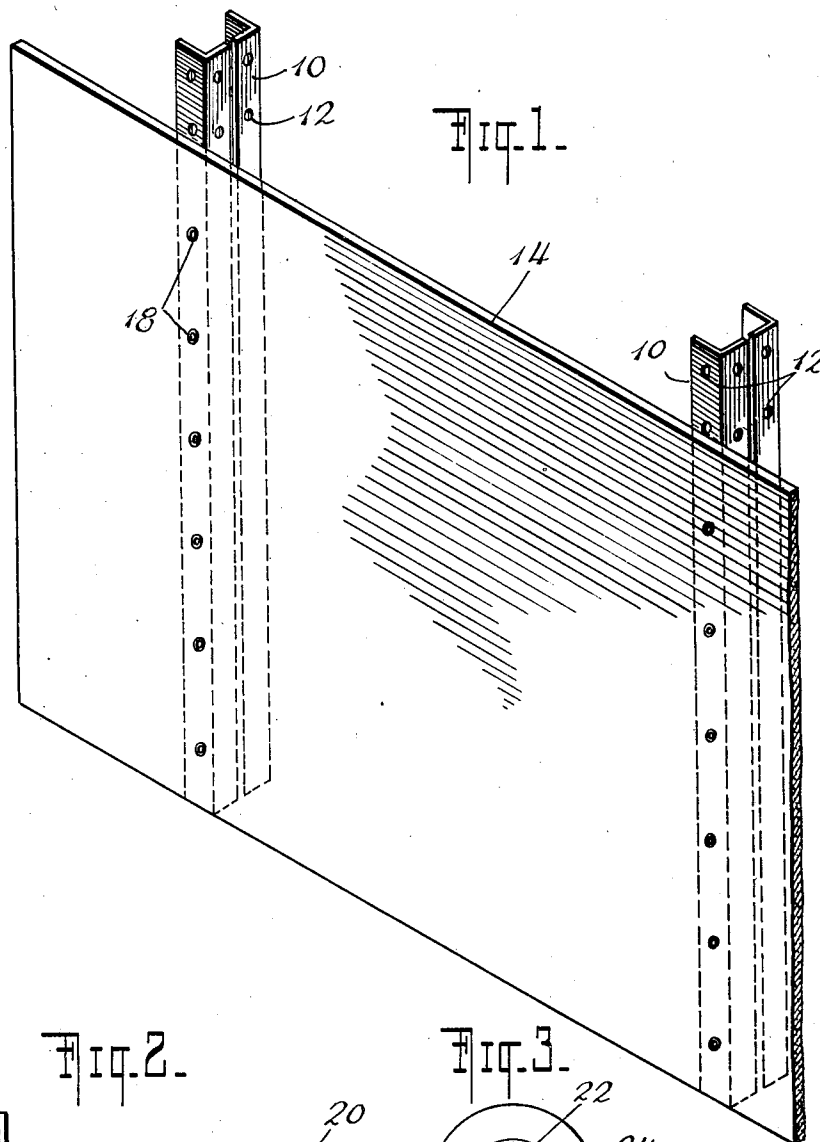
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1,969,897

HOLLOW RIVET

Filed Dec. 1, 1930

2 Sheets-Sheet 1



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Fig. 4.

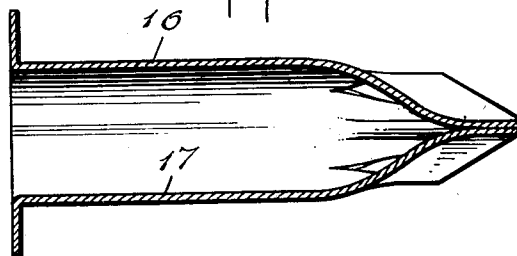


Fig. 5.

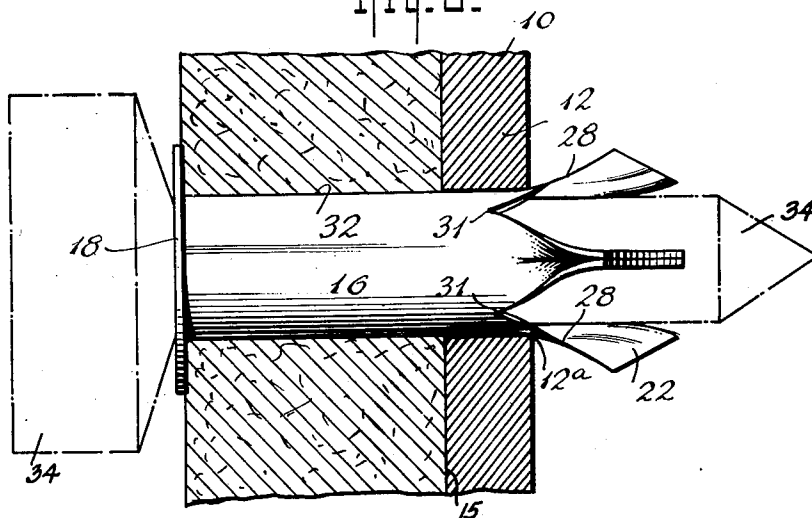
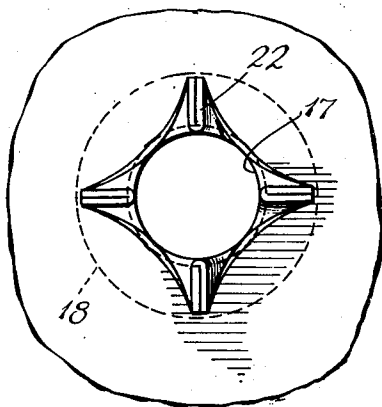


Fig. 6.



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1,969,897

HOLLOW RIVET

William E. Meissner, New York, N. Y.

Application December 1, 1930, Serial No. 499,227

10 Claims. (Cl. 85—40)

The present invention relates to a method and apparatus for securing construction materials such as wall boards, lath and the like to skeleton framework for buildings and more particularly it relates to an improved rivet construction and the method of using such a rivet for the purpose of securing wall board and similar construction materials to a type of steel framework which is uniformly punched with small holes for attaching all materials thereto.

cure the cover material to the steel supporting frame.

It is another object of this invention to provide an improved rivet for securing construction materials to steel framework which will permanently hold the materials under tension and which will not lose its tension in use.

It is another object of this invention to provide a hollow alloy rivet having a fluted pointed end of smaller resistance which may be projected through a wall covering material and the perforations in a steel frame after which the flutes may be expanded from the side from which the rivet was projected to force the elements into close tensioned contact.

Another object of this invention is to provide an alloy rivet provided with expansion studs which requires no backing and which is inexpensive and driven like a nail and which has greater shear and tensile strength than other corresponding securing means and by which a smaller number of elements per unit of area may be used.

Further objects and advantages of this invention will appear from the following description thereof taken in conjunction with the attached drawings which illustrate a preferred form of embodiment to which my invention is adaptable and in which:

Figure 1 is a perspective view of a part of building construction.

Figure 2 is a side elevation of a hollow rivet.

Figure 3 is an end view of the hollow rivet shown in Figure 2.

Figure 4 is a central section through a hollow rivet.

Figure 5 is an elevational view with parts in cross-section showing the rivet in expanded form.

Figure 6 is an end view of the rivet shown in Figure 5 and showing the rivet in expanded form and also showing the expanding tool before withdrawal.

As shown in Figure 1, steel beams 10 of channel section are used as the principal framework for house and small building construction. The framework 10 usually includes two L shaped sections which are joined together by any suitable means, not shown, to form a U shape, corresponding to the usual size of wood beams which are normally twice as deep as they are wide. Where three inch by six inch wood beams would be used, two steel angles would be correspondingly used with a face of three inches and a depth of approximately six inches and similarly with other sizes normally used in building construction. The steel frame 10 is provided with a plurality of apertures 12 which are normally $\frac{3}{8}$ inch holes spaced on two inch centers throughout the length of the beam, and to the framework 10 is secured some form of wall covering or

The use of steel framework for large buildings is well known but such steel framework in substitution for the usual wood joists and beams in building small private houses has not been used because of the difficulty of securing wall coverings thereto. In the present construction steel girders and beams which are of unit size are perforated at fixed distances so that the wall boards or lath and other construction materials may be secured thereto. Such steel framework consists in the use of steel beams which are of angular shape having a plurality of spaced perforations on each flange of the beam, the perforations approximating $\frac{3}{8}$ of an inch in diameter, and spaced at approximately 2 inch intervals. The construction materials such as wall board of either the plaster board or insulating material type, or lath of either the metal or wood variety for use as a backing and foundation for plaster have been secured to the skeleton framework either by means of wire, or by the use of nails and suitable nailing plugs inserted in the holes. Such fastening means are unsatisfactory commercially, however, because of the time required in securing the construction materials and the unsightly insecure joints when such materials are used. Rivets are entirely unsatisfactory because of the impossibility of backing the rivets as the construction materials are placed too close to one another as, for example, on opposite sides of a steel beam unit, that it is impossible to reach in between the walls to back the rivets.

It is, therefore, the principal object of this invention to provide an improved method of securing wall board and other non-metallic or metallic construction materials to perforated skeleton steel framework.

It is another object of this invention to provide a novel method of securing lath, plaster board, and similar material to perforated steel framing in small building construction.

It is another object of this invention to provide an improved method of constructing buildings of steel framework.

It is another object of this invention to provide a novel unit of building construction including perforated steel girders and covering material and a securing means which may be quickly, economically and effectively used to se-

10 wall board 14 which acts as a covering for the wall. Although it is indicated in Figure 1 as being in the form of a large sheet of material such as commonly known plaster board, sheet
 15 rock, or insulite, it will be obvious that this invention relates to all forms of wall covering including lath and plaster, sheet metal or any other known form of construction material and not only includes wall covering but ceiling and other construction as well.

10 In order to secure the wall covering 14 to the steel work 10, I have provided a rivet 16 which is tubular and whose central section corresponds approximately in diameter to the diameter of
 15 the holes 12 in the steel work. The rivet 16 is provided with a head flange 18 which is preferably of sufficient size to effectively retain the covering material to the steel work and the forward part of the rivet is provided with a crimped and formed end 20. As shown in Figure 3, the
 20 end 20 is provided with a plurality of flutes or fluted sections 22 which form a central point 24, and the pointed part 24 is provided with an angular side portion 26 for a purpose to be hereinafter shown. The end has certain small apertures 23 which aid the removal of material when
 25 the rivet is forced through plaster or similar material, these apertures being formed by the sides of the flutes 22. The flutes 22 break away in a curved portion 28 back to the body of the rivet 16, the curved portion 28 being of sharp outline and adapted to cooperate with the interior of the framework.

30 The rivet is preferably cut with two or more cross cuts forming four or more individual flutes, and the cuts may be in planes at right angles to each other. The cuts extend to a depth leaving a space between the bottom of the cut and the flange which is less than the thickness of the
 35 plaster board or wall coverings, and the thickness of the steel frame 10. This is shown in Figure 5 in which the plaster board 14 and the flange of the steel frame 10 take up a greater length of the rivet than the space between the head 18, and the bottom of the cuts 31.

40 The rivet 16 is preferably cylindrical as shown in Figure 4 and may be formed of any suitable alloy depending on the strength and ductility desired. Copper rivets are particularly effective for most materials and are easily formed while
 45 brass rivets are relatively difficult to form, but have a much greater strength. The rivet is preferably made by crimping the ends of a tube to form the flutes, but it may be desirable to form the rivet by die casting or by any other means.

50 In order to secure the wall board to the steel framework the wall board or covering 14 is first marked to correspond with the apertures in the steel framework, it being understood that it is usually only necessary to use one rivet for intervals greater than that between rivet holes in the beams 10, and only one rivet will be used for a number of frame holes. The rivet 16 with the aid of the pointed tip 24 is then driven through
 55 the wall board, the curved flutes displacing the material and forming a suitable hole 32 in the wall board. The rivet is then forced through the apertures 12 in the steel frame 10 and the flange 18 is brought in tension contact against the outer face of the wall covering 14. If the covering 14 is already correspondingly apertured, little or no force is necessary. A tool 34 having a shank substantially the diameter of the interior of the rivet is then inserted in the hollow center 17 of the rivet and forced against the inwardly bent
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portions of the flutes 22 at the pointed end of the rivets as will be seen in Figure 3. By further driving the tool 34 inward, the flutes 22 are forced outwardly and expanded as shown in Figure 5. As the flutes begin to bend at the bottom of the cuts 31, the curved surfaces 28 are forced into contact with the edges 12a of the apertures 12 in the steel framework 10, and, furthermore, as the tool 34 is driven further the curved edges 28 are cut by the relatively harder edge of the steel framework and these cuts tend to prevent any attempt to displace or move the rivet. The flutes 22 also tend in expanding, to draw the head 18 into greater tension contact against the wall covering 14, and the wall board 14 is forced into tensioned contact with the steel framework along the edge 15.

When the flutes 22 are expanded they appear as shown in Figure 6, leaving a central aperture 17 which is substantially the internal diameter of the hollow rivet 16. As the wall covering is usually covered by plaster or stucco or other materials, the aperture 17 may be suitably filled by such material. It is also possible to fill the aperture with a wooden plug or by other desired materials, the tool 34 being withdrawn after use. If a plug is inserted in the rivet, it may be of sufficient length to prevent the collapse of the flutes and prevent the withdrawal of the rivet. Tension on the flange is normally insufficient to cause a collapse of the flutes because of the tendency of the rivets to be partially cut by the steel framework.

After the rivet has been suitably expanded it will be substantially impossible to remove the rivet or the wall board without completely destroying it. With such construction it is unnecessary to provide any separate or additional means for backing the rivet as the rivet may be completely backed or expanded from the side from which it has been applied. With the steel frame construction to which no nails may be fastened, and which spaces the respective wall coverings only the distance of the two channels it is thus possible to expand the rivet from the outside thus avoiding the use of wires or other expensive securing means. The rivet is inexpensively formed on any desired automatic machine or may be manufactured in any other preferred form. It is relatively easy to apply to metal, wood plaster, or any other form of construction material and with its enlarged head will not destroy the materials to which it is applied and is permanent after application. It maintains the materials under tension against the steel framework, and due to its large cylindrical area it will effectively resist sheer and thus a smaller number of rivets of this type are required. It completely fills the hole so that there can be no movement of the wall board, and although prearranged holes may be formed in the wall covering, such holes are not necessary with the pointed end of the rivet which may be made of such materials that it can be forced through the usual construction materials.

The rivet is easily made, quickly applied, with the minimum of labor and is thus economical and effective. It forms a unit of building construction with the wall board and steel frame and makes a steel frame housing adaptable to receive a wall covering as easily as by nailing.

While I have shown a preferred form of embodiment of the device, I am aware that other modifications may be made thereto and I, therefore, desire a broad interpretation of my invention.

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tion within the scope and spirit of the disclosure herein and of the claims appended hereinafter.

I claim:

throughout substantially the entire length by the insertion of a deforming tool.

7. A securing device of the class described for securing a relatively compressible sidewall material under compression against a framework, comprising a thin wall tubular rivet having a head portion to engage the sidewall material, a central tubular body portion and a plurality of crimped portions adjacent the end thereof to form a plurality of flutes each of said crimped portions being cut away from the adjacent crimped portion throughout the crimped length, said body portion being adapted to temporarily receive a deforming tool having a central shaft substantially the size of said body portion to deform said crimped portions, the uncut portion of the rivet being shorter than the combined thickness of sidewall material and framework, whereby on expansion of the crimped portions, the framework and sidewall material will be maintained under compression.

8. A securing device for securing a relatively compressible construction material to a relatively incompressible framework, comprising a hollow rivet capable of being driven through said construction material, said rivet having a head engaging said construction material and having a pointed end portion, said end portion consisting of separate crimped portions forming flutes substantially extending into the center of the rivet, each of said crimped portions being separated, by cuts through the rivet, from each other, said rivet having an uncut body portion between the crimped end portion and the head less in length than the combined thickness of the construction material and framework, said crimped portions being expandible whereby said construction material is held in a tensioned relation against said framework.

9. A securing device for securing a siding to a pre-perforated thin wall metallic superstructure, comprising a tubular rivet of substantially constant wall thickness, said rivet having a head portion to engage said siding, a substantially hollow cylindrical body portion and a pointed end portion, said end portion including separately cut and crimped sections forming flutes, the maximum diameter of which is not more than the diameter of the body portion, said flutes being pointed whereby said rivet may be self centering and adapted to fill the perforation into which it is driven, said rivet being adapted to receive a deforming tool cooperating with the internal projections of the flutes to force the end sections sufficiently out of position beyond the superstructure regardless of small variations in total thickness of the siding and superstructure, whereby said sections will engage the metallic superstructure on the opposite side from the siding and at an angle transverse to the axis of the rivet, the crimped sections exerting a leverage on the metallic structure and being partially cut by the edges of the respective perforations of the metallic structure.

10. A metal rivet for attaching wall material to metal framework comprising a tubular body portion, a head at one end thereof, a plurality of longitudinal slits in the other end thereof forming segments between said slits, each segment being crimped inwardly substantially at its longitudinal center thereby producing an end portion of constricted diameter.

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1. As an article of commerce, a rivet having a hollow tubular body portion, a flange at one end thereof, and a plurality of crimped flutes at the other end, the exterior portions of said flutes converging to a point at the center to form a substantially closed central point, said flutes adapted to be expanded by an expansion tool, the ends of said flutes being angular whereby said rivet may be used to pierce a construction material.

2. As an article of commerce, a rivet having a hollow tubular body portion, a flange at one end thereof, and a plurality of crimped flutes at the other end, the exterior portions of said flutes converging to a point at the center to form a substantially closed central point, said flutes adapted to be expanded by an expansion tool, the ends of said flutes being angular whereby said rivet may be driven through a construction material, the distance from said head flange to the points to which said flutes are adapted to extend being less than the combined thickness of the construction material and support on which the rivet is adapted to be used.

3. A securing device for building construction of the class described including a framework and an unperforated siding therefor, a rivet, a multiple sided fluted end thereon, said end being pointed, said rivet being self-perforating when forced into said construction material and said framework, the end on said rivet being expandible whereby said rivet will draw said construction material against said framework.

4. A securing device adapted for securing an unperforated construction material to a perforated framework which comprises a substantially cylindrical hollow rivet, said rivet being crimped adjacent one end to provide a plurality of central flutes, said flutes extending substantially into the center of said rivet, said flutes having a pointed end whereby said rivet may be projected through said construction material and said framework, said rivet being adapted to receive a deforming tool to deform said flutes against said framework to hold said construction material against said framework.

5. A securing device for securing a construction material to a perforated steel framework which comprises a thin wall rivet having a body diameter substantially equal to the diameter of the perforation and a length greater than the combined thickness of the construction material and framework, a constricted end on said rivet to form a point whereby said rivet may be driven through said construction material, said end containing all the material of the wall of the body, an internal constriction on said rivet, said rivet being adapted to receive an expanding tool to expand said internal constriction beyond the edge of the framework, said expansion forcing part of the end of the rivet to engage the framework on the side opposite the construction material and at an angle to the axis of the rivet to draw said construction material against said framework.

6. As an article of commerce, a perforating rivet comprising a head, said head having an opening to receive a deforming tool, a tubular body portion, and a pointed end, said pointed end portion having at least three crimped flutes, said end portion being slit between flutes, said flutes extending centrally into the tubular body portion, and being adapted to be expanded

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