To all whom it may concern:

Be it known that I, William H. Woerheide, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Fastening Devices for Roofing, of which the following is a specification:

My invention relates to fastening devices for securing sheets of prepared roofing in place by nailing or otherwise fastening the devices onto the laps, butt joints and flashings of the roofing sheets.

The object of my invention is the production of a device of the above character from light-weight and inexpensive metal which devices are so constructed that they have the necessary inherent strength to effect a continuous and uniformly firm binding pressure over the laps and flashings of the roofing sheets, at the same time, the devices are of such short length as to give an individual character to each one.

I am aware that it is not broadly new to use devices, each of which forms a separate and distinct unit of a general scheme of fastening, but all of the devices heretofore used have been of a design and character which could not effect a continuous pressure over the laps; they have also lacked the inherent strength to resist heavy nailing pressure when made of the light-weight metal to which they are limited in order to confine their cost within reason.

Strips of metal of considerable length and having various formations and employing a multitude of nails for holding each strip in position are in general use for securing prepared roofing. While some of these strips are thoroughly efficient they have some disadvantages which it is the object of my invention to overcome. In the first place, these strips require a certain strength and weight of metal to resist the stress and strain incident to the nailing pressure as they are secured in position. This weight of metal required is considerably greater than was formerly employed in the old-style accessories, viz.: (tin caps) and therefore these strips cost considerably more to produce and are consequently handicapped in this important respect.

My devices due to their peculiar construction and design, may be made of much thinner and lighter-weight metal than is possible in the manufacture of fastening strips, while at the same time they resist an even greater nailing pressure without distortion than the strips which are made of heavier metal, and therefore, create a greater pressure over the entire lap than is exerted by said strips. It will be apparent, therefore, that by the use of my invention, I am, for the above reasons, enabled to effect a considerable economy in the manufacture of the devices.

Another advantage that my invention has over the strips in general use is due to the fact that in their design each unit is short, which makes it possible to use these devices for either long or short stretches of roofing without any substantial loss of metal, and upon the other hand, to terminate laps within a fraction of an inch, which makes my invention well adapted for use on flashings, butt joints, and the like.

The functions of each of my devices are entirely separate and distinct from the functions of the others, and if it is necessary to use one or many devices the same efficiency is secured in all cases. For convenience I prefer to manufacture the devices attached together in any suitable and convenient number, so that they may be readily handled and applied upon a roof without the necessity of handling each one separately. They are nevertheless easily separated one from the other and may be separated and applied to the roofing with a short space, say one-eighth of an inch, between the ends of adjacent devices, although it will be preferable in most cases to apply them attached together. There is another distinct advantage incident to the individual character of the devices, which advantage is the facility with which they may be applied around short corners while attached together, and over boards which have become warped or cupped, thus forming an irregular surface, the construction and individual character of the devices making them efficient at all points.

Speaking generally, the device consists of a piece of metal which has an oblong base, preferably rectangular, and having a general frusto-pyramidal shape. It also has prismatic portions, the bases of two of which constitute the base of the device. The metal between the top and sides of these two prismatic portions is drawn into an enlarged generally prismatic or wedge-shaped portion inverted with respect to the first two portions. The two bottom prismatic por-
tions are therefore separated from the enlarged top portion by a line in which the metal has been drawn and "set" by the process of drawing. The "setting" makes this line very rigid and gives additional strength to the walls against compression caused by the nailing pressure. In other words, these "set" lines are so located in the metal that they form inherent trusses to support the sides of the device.

Other advantages and features of my invention will be apparent from a reading of the following description taken in connection with the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a side elevation of a plurality of the devices attached together; Fig. 2 is an enlarged side elevation of one of the devices: Fig. 3 is a top plan view of the device shown in Fig. 2; Fig. 4 is an end elevation of the device shown in Fig. 2; Fig. 5 is a longitudinal section on line 5-5 of Fig. 3; Fig. 6 is a perspective view of the device when fastened in position; and Fig. 7 shows in diagrammatic view of the device applied to a roof in which the boards are warped.

 Broadly considered, my device consists of a single piece of metal drawn into a frusto-pyramidal shape and comprising three prismatical portions 1, 2 and 3. The portion 1 is not truly prismatical in form, its base being cut away at its ends along the lines 5 and 6 which lines are substantially parallel with the lines 7 and 8 forming the outer sides of the prisms 2 and 3, respectively, and also constituting the ends of the device. This portion 1 is drawn so that it is substantially larger than, and bulges over, all sides of the portions 2 and 3. This is accomplished by drawing the metal along the lines joining the points 9, 10, 11, 12, 13 and 14. After this metal has been thus drawn it is "set" in the well-known manner so that it will not again assume its original position or configuration, and at the same time forming means in the metal. The portion 1 has a flat top 15 which is preferably rectangular, as clearly shown in Fig. 3. Through this top is made an opening 16 through which a nail, or other suitable fastening device may be inserted.

In drawing the metal sheet into the form shown, flanges 17, 18, 19 and 20 are produced. These flanges run from a maximum width at the corners of the device to a point near the middle of the device at which point they are reduced to zero so that there is no flange at the middle part. The metal is also drawn so that the body thereof has a general bowed shape, while the base-line is in a true plane. During the drawing operations lines 21, 22, 23, 24, 25, 26, 27 and 28 are formed along the corners of the device. These lines are also "set" so as to give great strength and rigidity to the completed structure. These lines, as well as the lines joining the various points 9, 10, 11, 12, 13 and 14, form in effect other inherent trussing means united at all points with the metal constituting all sides of the portions 1, 2 and 3.

As a result of the enlargement of the portion 1 and the formation of the various "set" lines above described, when pressure is exerted on the top 15 by means of a nail through the opening 16, this pressure is transmitted through the portion 1 to the top of the portions 2 and 3, as well as to the sides of these two portions, joining the points 10-9 and 9-14 and 14-13 of portions 1 and 2, and the points 10-11 and 11-12 and 12-13 of the portions 1 and 3. This pressure is also transmitted to the ends of the device through the set lines 21, 22, 23 and 24. Due to this construction a firm pressure is exerted at all points of the base of the device so as to hold the roofing securely in place at all points thereunder, while at the same time the flanges 17, 18, 19 and 20 prevent the metal from hitting into the improperly soft roofing composition too much. These flanges also have the function of preventing the cutting of the roofing by the metal when the roofing is caused to vibrate in service by means of wind and other causes. The position which the device assumes when in service is clearly shown in Fig. 6.

Another feature of the device is that the top portion 1 is of such size that when the nail is being driven into position the face of the hammer will strike the top along lines 29 and 30, thus bulging the portion 1 at all points where it joins portions 2 and 3, and thereby distributing the thrust and compressive strain evenly throughout the entire base of the device.

Fig. 7 shows, in diagrammatic manner, the advantage resulting from the individual character and comparatively short length of each of my devices. It is frequently found in practice that whenever two or but joint runs across the sheathing boards, which in roofing construction are 6 to 12 inches wide, these boards have become warped, as at 31, or cupped, as at 32, so as to make an uneven edge between the boards 31, 33 and also a curved surface, as shown in the boards 31 and 32. The difficulty of properly fastening the roofing in position on a surface of this character is evident when using comparatively rigid fastening strips of considerable length. It is also apparent that this difficulty is overcome by the use of devices of the construction and individual character above described.

From the foregoing it will be seen that a device having individual functions may be easily and cheaply produced in great quantities from light and inexpensive metal.
There are many advantages, which are of prime importance in practice, resulting from the individual character and great strength of this device. It will be observed that it makes little difference how hard the nail is driven home so long as it is driven down far enough to pull the device firmly into contact with the roofing. This makes it possible to give simple instructions to those who are to use the device, i.e., to drive all nails firmly. It is impossible for the ends of this device to kick up so as to render the roofing loose at these points. The construction is such that as long as there is pressure upon the portion 1 this pressure is transmitted substantially equally to all points of the base of the device, thereby holding it securely and uniformly in contact with the roofing.

By a construction of this character I am enabled to economize in the weight, as well as in the cost of the metal, to a comparatively large percentage, while at the same time producing a device having many advantages over the devices heretofore used for this purpose. There are many advantages coming from the use of the lighter metal, one of which is that the dies for drawing or punching the devices will last a much longer time when used with lighter metal than if used with a metal of a weight necessary to secure the required strength in devices used for this purpose, as heretofore constructed.

My device may be modified in some respects without departing from the spirit of my invention, and I do not intend to be limited to the specific device shown in the drawings.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A sheet metal fastening device for roofing comprising a piece of metal drawn into a substantially pyramidal shape and having inherent truss lines drawn therein at an angle to the base, whereby pressure exerted on the top of said device will be transmitted to all points of the base thereof.

2. A sheet metal fastening device for roofing made from a single piece of sheet metal and having an oblong base with a pyramidal portion rising thereon and having an enlargement at the upper portion thereof.

3. A sheet metal fastening device for roofing made from a single piece of sheet metal and having an oblong base with pyramidal portions rising thereon and united by a line of drawn and set metal.

4. A sheet metal fastening device for roofing having a frusto-pyramidal shape with a rectangular base, each side of said device having therein portions drawn into general triangular formation.

5. A hollow sheet metal device for fastening roofing having frusto-pyramidal shape and an enlarged drawn portion for receiving a fastening means and transmitting the pressure thereof to all points of the base of said device.

6. A hollow sheet metal device for fastening roofing having frusto-pyramidal shape and an enlarged drawn inverted prismatic portion for receiving a fastening means and transmitting the pressure thereof to all points of the base of said device.

7. A sheet metal fastening device for roofing having a rectangular base and gradually converging sides rising therefrom and an enlarged top portion integrally connected with said sides.

8. A sheet metal fastening device for roofing having a rectangular base and gradually converging sides rising therefrom and an enlarged top portion integrally connected with said sides by lines of drawn and set metal.

9. A sheet metal fastening device for roofing having a rectangular base and gradually converging sides of drawn metal rising from said base and an enlarged top portion further drawn from said sides and integrally united with the sides by lines of drawn and set metal.

10. A sheet metal fastening device for roofing having a base and sides rising from said base more abruptly than the ends do and lines of set metal joining said sides and ends and an enlarged top portion rising from said set lines and adapted to receive a fastening means.

11. A sheet metal fastening device for roofing having a frusto-pyramidal shape with a rectangular base, each side of said device having portions drawn therein and bounded by set truss lines at an angle to said base.

12. A sheet metal fastening device for roofing of frusto-pyramidal shape having a rectangular base, portions of said device having prismatic formation, the base of at least two of said prismatic portions forming the base of said device and an enlarged prismatic portion inverted with respect to said first portions and being drawn from 115 the metal and integral with the other portions.

13. A sheet metal fastening device for roofing having an oblong base, said base being constituted by the bases of two adjacent pyramids and integral inherent means for applying pressure at the top of said pyramids and thereby distributing said pressure over the entire base of said device.

14. A hollow sheet metal device for fastening roofing, comprising a single piece of metal formed in frusto-pyramidal shape and having its sides more abrupt than its ends, thereby forming a rectangular base, said device also comprising a plurality of 130...
small prismoidal portions, the bases of two
of which constitute the base of the device
and another of said portions being larger
than the first two portions and inverted
with respect thereto and drawn from the metal
between said first two sections and integral
therewith.

15. A hollow sheet metal device for fast-
ening roofing, comprising a single piece of
metal formed in frusto-pyramidal shape
and having its sides more abrupt than its
ends, thereby forming a rectangular base,
said device also comprising a plurality of
small prismoidal portions, the bases of two
of which constitute the base of the device
and another of said portions being larger
than the first two portions and inverted
with respect thereto and drawn from the metal
between said first two sections and integral
therewith.

16. A hollow sheet metal device for fast-
ening roofing, comprising a single piece of
metal formed in frusto-pyramidal shape
and having its sides more abrupt than its
ends, thereby forming a rectangular base,
said device also comprising a plurality of
small prismoidal portions, the bases of two
of which constitute the base of the device
and another of said portions being larger
than the first two portions and inverted
with respect thereto and drawn from the metal
between said first two sections and integral
therewith.

17. A sheet metal fastening device for
roofing having an oblong base with sides
converging from the base into a frusto-
pyramidal formation, said sides being
drawn into three prismoidal portions, two
of which have their base along and consti-
tute the base of the device and the third
portion being larger than and inverted with
respect to the other two so that its base
forms the top of the device and having an
opening through its base to receive a fast-
ening means.

In testimony whereof, I have signed my
name to this specification, in the presence
of two subscribing witnesses.

WILLIAM H. WOERHEIDE.
Witnesses:
Newton A. Burgess,
Edwin Sigler.