

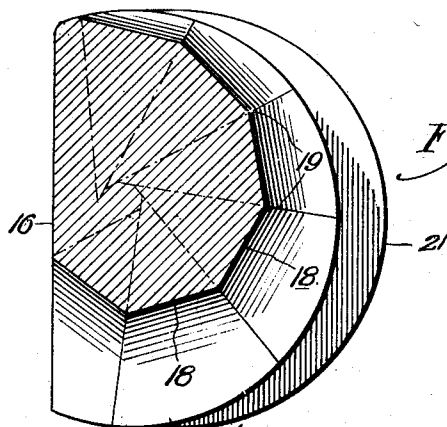
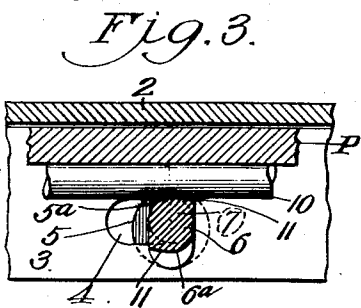
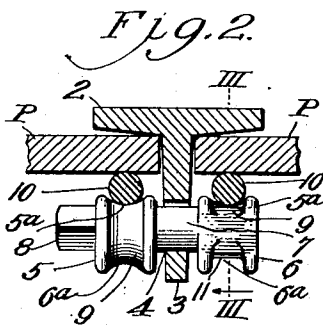
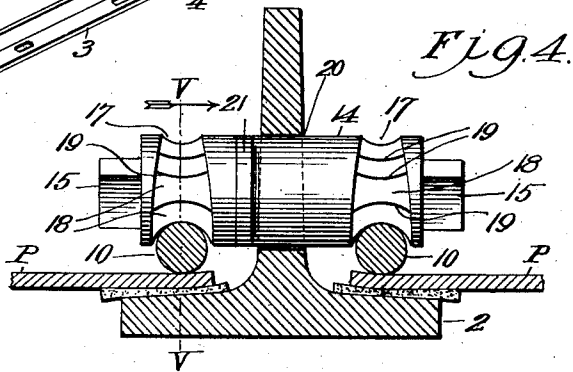
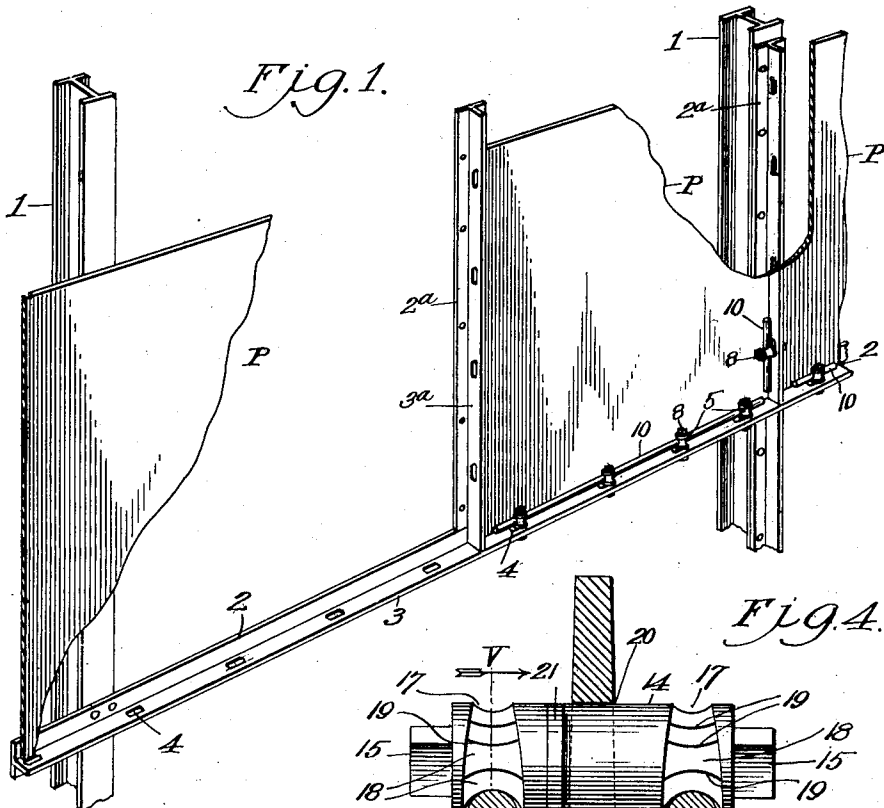
Oct. 5, 1937.

G. P. REINTJES

2,095,037

CAM LOCK SHEET CLAMPING DEVICE

Filed April 12, 1934



Inventor
George P. Reijntjes.

By *Thorpe & Thorpe* Attorneys.

UNITED STATES PATENT OFFICE

2,095,037

CAM LOCK SHEET CLAMPING DEVICE

George P. Reintjes, Kansas City, Mo.

Application April 12, 1934, Serial No. 720,235

5 Claims. (Cl. 189—34)

This invention constitutes a continuation in part of my application for patent filed July 13, 1931, Serial No. 550,347, and relates to sheet clamping devices and is particularly adapted for use in clamping plates or sheets to a skeleton frame for the production of tanks, grain bins and the like, and is moreover also suitable for securing the outside sheathing of furnaces or boilers where the sheathing is subjected to expansion and contraction due to the heat of the furnace or the like. It has heretofore been standard practice in furnace and other skeleton metal constructions to secure the pressed or molded asbestos or metal sheets by bolting them to the upright skeleton frame through the matching of punched holes. This method requires lay-out drawings and the like, and is expensive, slow and on the whole, unsatisfactory.

The general object of the present invention therefore, is to provide a clamping mechanism of strong, durable, efficient and inexpensive construction, whereby plates or sheets may be readily applied to and securely held in position without the necessity of punching the edges to match up with openings in the supporting framework.

Another object of the invention is to provide a clamping mechanism of the general character outlined which is particularly adapted to accommodate expansion and contraction of the sheathing material of a furnace or the like.

A further object of the invention is to produce a clamping structure in which the cam clamps are provided with a plurality of operating faces for progressively increasing the clamping pressure, each successive clamping face being in effect the chord of a larger circle, whereby the cam is automatically locked with any of its faces in operative position.

With the general objects named in view, and other as will hereinafter appear, the invention consists in certain novel and useful features of construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawing, in which:—

Figure 1 is a perspective view of a skeleton framework or the like, embodying the invention, partly broken away to more clearly illustrate the parts.

Figure 2 is a section through a clamp mechanism embodying the invention.

Figure 3 is a section on the line III—III of Figure 2.

Figure 4 is a section, similar to Figure 2, but of a modified type of cam clamp.

Figure 5 is a section on the line V—V of Figure 4.

In the said drawing, where like reference characters identify corresponding parts in all of the figures, 1 represents an upright skeleton framework around or supporting a tank, furnace or the like. Bridging the space between the columns 1, and secured thereto, are horizontal angle iron base members or supports 2, which, between the same columns, will be vertically spaced apart and thus produce a strong skeleton structure providing relatively rectangular openings to be covered or spanned by and carry plates or sheets, hereinafter identified, to be clamped in position. Where the columns are widely spaced apart, vertical base members may be interposed between them as shown, such members being adapted for connection at their ends with adjacent horizontal base members as indicated at 2a. The base members 2 and 2a are provided with flanges 3 and 3a projecting at right angles to their respective base portions, and the latter are shown as of T shape, but this shape is necessary or desirable only where plates are to be clamped in place at both sides of the flanges. L shaped base members are suitable and preferable at the ends and top and bottom of the furnace, tank or other structure. In some cases flanges 3 may be formed on or secured directly to the vertical columns 1.

The flanges of the base members for the type of clamping mechanism shown in Figures 1, 2 and 3, are formed with a plurality of elongated spaced holes or openings 4, and journaled in each of said openings is a clamping mechanism comprising a pair of cams 5 and 6, each cam having a plurality of clamping faces so that sheets of different gage may be mounted in clamped position. As illustrated, each cam has a pair of clamping faces 5a and 6a in the figures mentioned, respectively spaced closer to and further from the axis of rotation, and said cams are connected together by an intermediate cylindrical shaft portion 7. Each cam 6 is oblong and of size to pass through its respective opening 4, while the cams 5 have circular flanges of such diameter that they cannot pass through the openings. Hence, where the devices are assembled on a horizontal flange with cams 5 uppermost, they cannot slip from position, even when loose. In order that the cams may be rotated to clamping position, one end of each is formed with any suitable head to receive a wrench or other tool.

Each face 5a and 6a of each cam is formed with a notched portion 8 of such width as to

embrace a clamping rod 10 or the like, interposed between the cam and the adjacent face of the plate P, it being noted that the operative faces of the cams as shown at 11, are so made that
 5 when the cam is in full clamping position, it has, in effect, passed center so that it is self-locking. With this construction it will be evident that the edges of the plates P are clamped tightly in position for their entire length, and that the plates
 10 are still free for expansion and contraction when subjected to fluctuations in temperature. It will also be evident that the clamping mechanism can impinge directly on the edges of the sheets or plates without the interposition of the clamping rods, by a slight change in their construction.

In Figures 4 and 5, a modified construction is shown, in which there are more clamping faces than illustrated in Figures 2 and 3, and in which
 20 the cam members are identical at opposite ends of the device instead of being of dissimilar shape as in the previous figures of the drawing. In this modification, a cylindrical clamping lug or cam 14 is formed at its opposite ends with wrench engaging heads 15, and has one of its sides flattened as at 16. Adjacent the heads, the cam is formed with scores or grooves 17 which spirally approach the axis of the clamping lug or cam 14. The bottom of each spiral groove is formed with
 25 a series of flat clamping surfaces 18 (see Figure 5), and as the groove is struck on a spiral the result is that the clamping surfaces are each, in effect, the chord of a smaller circle, counting from the perimeter of the clamp lug. Thus the shoulder or corner 19 between each pair of adjacent clamping surfaces forms a locking means, so that the cam cannot accidentally loosen up after installation, as the tightening of the cam requires that it be turned past center as far as its
 30 corner is concerned, since the corner is on the perimeter of a circle, while the face of the cam is a chord of such circle. The construction of the cam lug is clearly apparent from a consideration of Figure 5, on which the parts appear as
 35 in actual practice. From a consideration of the construction, it will be apparent that the cam surfaces may be protruding rather than receding for cooperative engagement with the face of a plate or the like, to be clamped in position. In this construction, the cam device is fitted in
 40 a circular hole in the base rather than in an oblong hole, as in Figures 2 and 3, and the lug is provided with a protruding shoulder 20 at one end to keep it from falling from position when
 45 assembled on a horizontal base member.

In the preferred constructions it will be noted that the faces of the base members in both types, converge toward their respective flanges as in standard T or I beams, so that initially, or before sufficient clamping action occurs (see Figure
 50 3), the extreme marginal edges of the plates only are in contact with said base faces, and that clamping pressure may spring the plates. In some cases it may be desirable to supply packing
 55 as illustrated to make a joint liquid and air tight. In Figure 4, the plates appear in their sprung

positions as shown by the slight bending of their marginal portions engaged by elements 10.

From the above description, it will be apparent that I have described and illustrated a construction embodying the features of advantage set
 5 forth as desirable, and it is to be understood that I reserve the right to make all changes without the ambit of the prior art and within the spirit of the invention.

I claim:—

1. A sheet fastening construction comprising a
 10 base member having a projecting flange, said base member being adapted to extend parallel to sheets received on opposite sides of its flange, clamping members in contact with the faces of
 15 each sheet in opposition to the base member, and cam clamping mechanism journaled in the flange and arranged in spaced relation and adapted to simultaneously apply clamping pressure to said clamping members.

2. A sheet fastening construction comprising a plurality of spaced upright columns, a base member secured to and bridging the space between
 20 said columns and having a projecting flange, said base member being adapted to extend parallel to sheets received on opposite sides of its flange, clamping members in contact with the faces of
 25 each sheet in opposition to the base member, and cam clamping mechanisms carried by and journaled on the flange and in spaced relation and adapted to simultaneously apply clamping pressure on both of the clamping members.

3. A cam clamp for sheets, comprising a shaft formed adjacent its ends with cam members, one
 30 of said cam members being larger and the other smaller than an opening adapted to form a journal for the portion of the shaft intermediate the cam members.

4. A sheet fastening construction, comprising a base member having a flange outstanding from
 40 its face, the said face at opposite sides of said flange, converging toward the latter to stand at slight angles relative to the plane of sheets received on opposite sides of said flange and initially engaging at their extreme margins with
 45 said sloping faces, spaced clamping devices mounted on said flanges at opposite sides of the sheets from the base member, and clamping elements interposed between the clamping devices and said sheets for springing the marginal
 50 portions of the latter to conform to and fit flatly against the sloping faces of the base member.

5. The combination with a base member having a flange outstanding from its face provided with a line of openings, an integrally formed clamping device for each opening, each device having
 55 an intermediate portion rotatably engaging one of said openings, and having head portions at opposite ends of the intermediate portion provided with cam grooves, and a clamping element
 60 engaging the groove of each one of said heads, and a sheet received between said element and the base member and adapted to be clamped against the latter.

GEORGE P. REINTJES. 65