Sept. 11, 1934. G. WALTER 1,973,238

CLAMP

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Fig. 1.

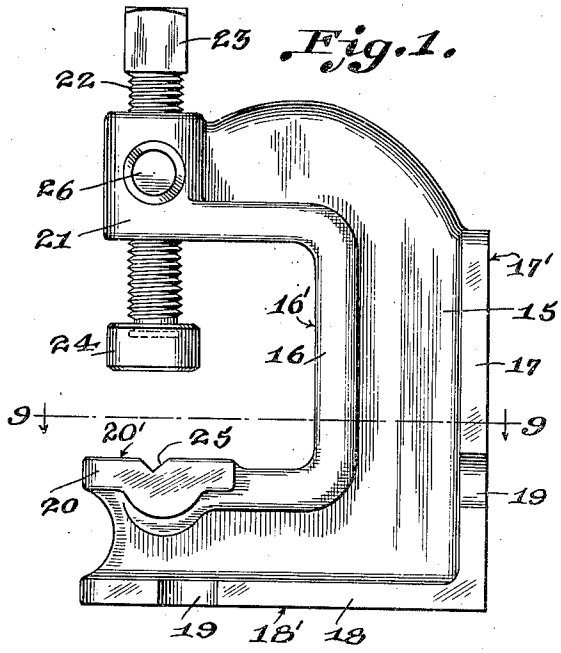


Fig. 2.

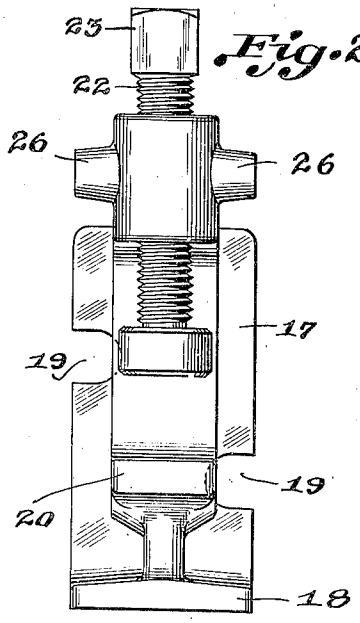


Fig. 3.

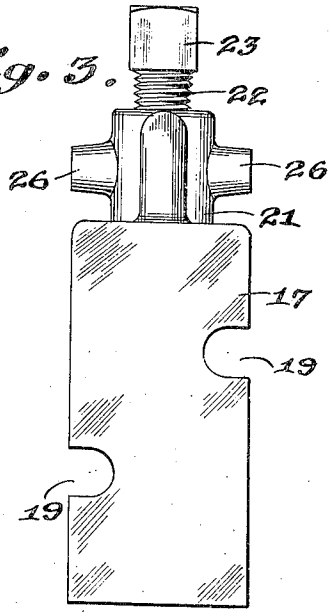


Fig. 4.

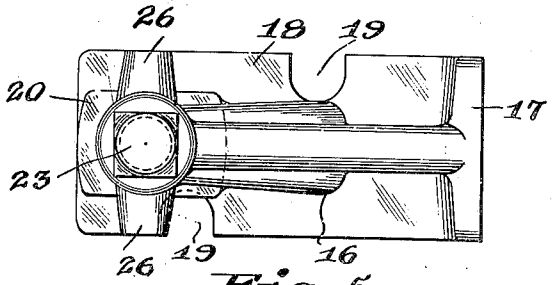
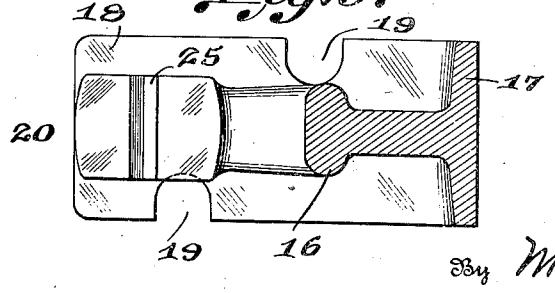


Fig. 5.



Inventor

Gustave Walter

By Mawhinney & Mawhinney

Attorneys

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Fig. 6.

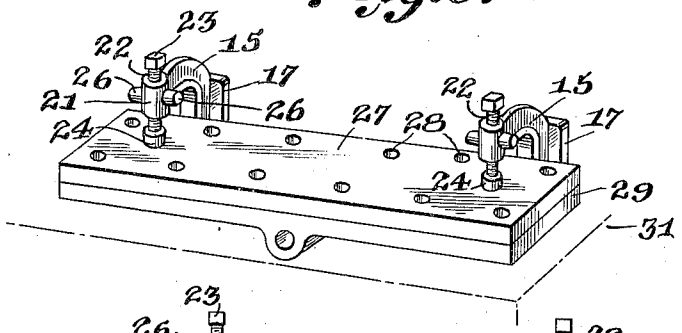


Fig. 7.

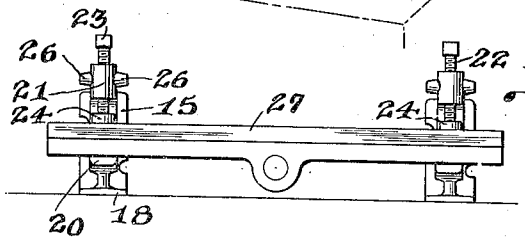


Fig. 8.

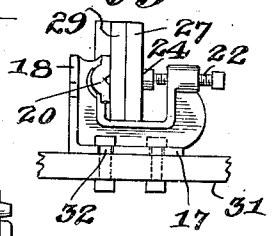


Fig. 9.

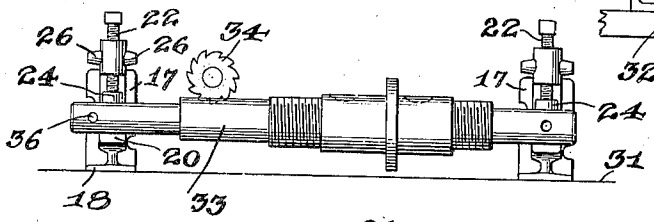


Fig. 10.

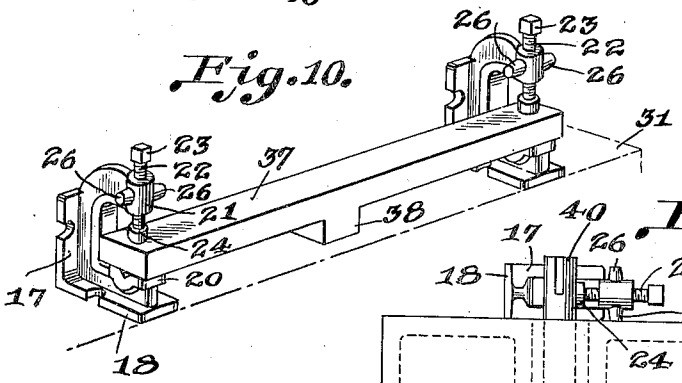


Fig. 11.

Inventor

Gustave Walter

By Mawhinney & Mawhinney

Attorneys

Patented Sept. 11, 1934 1,973,238

UNITED STATES PATENT OFFICE

1,973,238

CLAMP

Gustave Walter, Jersey City, N. J.

Application November 25, 1933, Serial No. 699,768

6 Claims. (Cl. 81—33)

The present invention relates to clamps, and has for an object to provide a clamp which may be used singly or in multiple, and of the same or relative dimensions, to admit of many and varied operations, such as, drilling, milling, planing, grinding and various lay-out operations.

Another object of the invention is to provide a clamp capable of these varied uses and which embodies the utmost simplicity in construction and use, and by the use of which may be eliminated the many costly fixtures now required for holding some oddly shaped work to be laid out and machined.

A further object of this invention is to provide a clamp capable of doing the work of an ordinary C-clamp and which also may be used to square up a clamped article without the use of expensive jig equipment for laying out and machine work.

A still further object of this invention is to provide a clamp of this character which may be supported flat on one end and on its back, and which may be supported in parallel relation upon its side on a support and has engaging points and surfaces of contact so distributed on the clamp that the clamp will hold the work without tilting and in true perpendicular relation to the face of the support.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views.

Figure 1 is a side view of a clamp constructed according to the present invention.

Figure 2 is an edge view of the same looking into the open or front edge of the clamp.

Figure 3 is a like view but looking at the rear or opposite edge of the clamp.

Figure 4 is an end view of the clamp, looking at the top when considered from the position shown in Figure 1.

Figure 5 is a transverse section taken through the clamp on the line 5—5 of Figure 1.

Figure 6 is a perspective view of a pair of clamps constructed according to this invention in one application of use wherein a drilling template is held in desired relation to a piece of work having an uneven lower surface and supported in a parallel plane on a support.

Figure 7 is a forward edge elevation of the same.

Figure 8 is an end view showing the template and work supported perpendicular to the support.

Figure 9 is a side elevation of a shaft mounted in the clamp of the present invention for cutting keyways and drilling holes in the shaft.

Figure 10 is a perspective view of an irregular bar of work mounted in the improved clamps for planing the bar and also for laying out the work, and

Figure 11 is a side elevation of another application of the clamp for supporting a stud on a drill press table to drill oil holes in the stud.

Referring now to the drawings, and first to Figures 1 to 4 inclusive, the clamp body 15 is of substantially C-shape, and comprises a web of substantial thickness reinforced at its inner marginal edge by a transversely enlarged and thickened bead 16. The outer edge of the web or body of the clamp has a back flange 17 which extends transversely of the web and beyond the opposite sides thereof, and which is relatively flat at its outer side so as to lie in a single plane and to afford a flat and substantial support for the clamp when the latter is turned over on its back. The back flange 17 extends a substantial distance in opposite directions beyond the web to provide a substantial base for the clamp to hold it from tilting when supported on its back. One end of the clamp, which may be referred to as the lower end relative to the position shown in Figure 1, is provided with an end flange 18 of the same lateral dimensions as that of the back flange 17, and which extends throughout substantially the entire length of the end of the clamp. The lateral edges of the flanges 17 and 18 are disposed in common parallel planes at opposite sides of the clamp, so that when the clamp is laid over on its side on a flat supporting surface, the lower edges of the flanges 17 and 18 have surface contact throughout their length and afford a substantial and solid support for the clamp in such position. The flanges 17 and 18 are also provided in their marginal edge portions with notches 19 adapted to receive the shanks of clamping bolts or the like therethrough so that the heads or other projections of the bolts may engage the inner faces of the flanges 17 and 18 for binding the clamp to a suitable support with either the back 17 or the end 18 in flat parallel engagement with the support.

The flat end of the clamp, carrying the flange 18, is provided with an anvil 20 which faces the opposite end of the clamp. This opposite end of the clamp has an internally threaded head 21 through which is disposed a clamping screw 22

of usual construction with a wrench receiving outer end 23 and an inner swivelled head 24. The head 24 is supported by the screw 22 in line with the anvil 20 so as to bind work between the screw head and the anvil. The screw head 24 preferably has a relatively flat work engaging face, while the anvil 20 has a flat work engaging face disposed in parallel relation to that of the head 24, and in addition is provided intermediately with a transverse kerf or angular groove 25 for the reception of round articles, such as shafts, pins, cylinders, or the like, to be engaged in the clamp. The groove 25 serves as an anchoring groove to hold rounded articles from slipping from beneath the head 24 of the clamp screw.

The internally threaded head 21 of the clamp body is provided at opposite sides with studs 26 which serve various purposes in the application and use of the clamp. These studs 26 are of substantial size and strength so as to reinforce the head 21 of the clamp to afford means for manipulating the clamp in drawing the head 21 thereof over a piece of work and receiving tools and the like thereagainst in the positioning and removal of the work. Furthermore, these studs 26 are of a definite length and have outer flat surface engaging ends lying in the said parallel planes of the outer edges of the back and end flanges 17 and 18 of the clamp.

It will be noted that the head 21 is disposed at one diagonal corner of the clamp body remote from the corner at which the flanges 17 and 18 merge, so that the studs 26 provide legs or supports for the otherwise unsupported corner of the clamp when the latter is laid over flat upon its side. It will also be noted particularly from Figures 2, 3 and 4 that the outer edges of the flanges 17 and 18 and the outer ends of the studs 26 terminate in planes spaced well beyond all other projecting portions of the clamp so that when the clamp rests upon a flat surface, all projections of the clamp will lie above the surface so that the clamp will be stable and firmly support the work in the desired perpendicular relation to the supporting surface.

While the clamp has a wide variety of uses incident to its peculiar construction, for the purpose of illustrating several uses of the clamp, reference is now made to Figures 6 to 11.

With reference first to Figures 6, 7 and 8, a pair of the clamps is employed for holding a drilling template 27 with gauge openings 28 therein against the flat side of a piece of work 29, the latter having at its opposite side one or more projections 30 which prevent the work from lying flat upon a table 31 or other support. In this instance, a pair of the clamps 15 is clamped over the superposed template 27 and work 29 as clearly shown, with clamp screws 22 binding the template and the work together. The clamps are placed on end on the table or support 31 with the end flanges 18 thereof lying flat upon the table or support. The web portion 15 of the clamp is disposed between the flange 18 and the anvil 20 is of sufficient height to hold the average projections 30 clear of the surface of the table so that the clamps when used in multiple as shown will support the work 29 in true parallel relation above the table 31, and thus admit of the desired operations on the work. Of course, any desired number of clamps may be used and the latter may be distributed about the work in any desired relation so as to provide the necessary support for holding the work from tilting or canting during the drilling or other operation. Of course, the flanges 18 may be clamped to the work by use of bolts, machine screws, or the like, as shown in Figure 8.

In Figure 8, the clamps are engaged with the template 27 and the work 29 in the manner illustrated in the Figures 6 and 7, but the clamps are overturned on their backs so that the back flanges 17 lie flat against the table or support 31. The table or support 31 is shown with a bolt 32 engaging the adjacent notch 19 of the clamp, so as to hold the flange 17 flat against the table. In this manner, the work and the template may be supported in a plane perpendicular to the table 31, so that the drilling operation may be carried on horizontally.

In Figure 9, a pair of the clamps is shown as applied to a shaft 33. The clamps are placed in upright position with the end flanges 18 resting on the support or table 31, and the screws 22 of the clamps are turned down to bind the shaft 33 from turning in the clamps. In such position of the shaft 33, a milling cutter 34, or other suitable tool, may be used for cutting a keyway 35 lengthwise in the side of the shaft, and also holes 36 may be drilled in the shaft at desired points for various purposes. It is apparent that the shaft is held rigidly and in a predetermined parallel position with respect to the table 31, so that all the collars, sleeves and stepped portions of the shaft are held above the table and the various operations may be carried on without expensive equipment for supporting the shaft in the desired relation to the cutter, drills and the like.

Figure 10 illustrates a piece of work 37 adapted to be planed, and which has a projection 38 which prevents the work from being secured or clamped flat against the upper surface of the table or support 31. In this instance, the clamps are engaged upon the opposite ends of the work 37, and the clamps located in upright position upon the table 31 so as to support the projection 38 above the table. It will also be noted that the edge of the work to be planed is secured in the clamps to lie in a plane beyond that of the open fronts of the clamps. The planing operation may now take effect with the work in a definite position. This arrangement may also be used in laying out work and with work of different shapes, sizes, and of various numbers of pieces which may be clamped or secured together.

One use of the studs 26 is shown in Figure 11. In this case, a clamp is employed which is overturned upon its side, so that the lower edges of the flanges 17 and 18 lie flat against the upper side of a drill press table 39 or the like, and through which is fitted a stud 40, or the like, for drilling oil holes therein. The stud 40 is secured in the clamp and extends transversely of the clamp and perpendicular to the table 39. The lower stud 26 lying in the same plane with the lower edges of the flanges 17 and 18 holds the clamp with its axis in parallel relation to the table 39 to effectively secure and hold the stud 40 perpendicular to the table.

It is apparent that the studs 26 may be used in adjusting or placing the work in the clamps, as they provide shoulders or abutments against which various tools may be placed for shifting the work and for otherwise operating the clamp.

The inner face 16' of the bead 16 and the inner face 20' of the anvil 20 are machined square to each other and parallel to their respective outer surfaces 17' and 18' so as to properly hold the work relative to the position of the clamp. Fig-

ure 8 shows how the work 27 and 29 is squared up in the clamp against the adjacent inner surfaces thereof.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims:—

What is claimed is:—

1. A clamp comprising a body portion having an anvil therein and a head in line with the anvil, a clamping screw mounted in the head in line with the anvil to bind work thereagainst, said clamp having flat back and adjacent end flanges disposed in rectangular relation relative to each other and providing flat supporting bases disposed respectively in planes parallel with and perpendicular to the axis of the clamp, and lateral projections carried by said head of the clamp and terminating at their outer ends in the lateral planes of said back and end flanges.

2. A clamp comprising a substantially C-shaped body having a reinforcing web at its inner edge and an anvil at one end and a head in its opposite end, a clamping screw mounted in said head in line with the anvil, and back and end flanges carried by the clamp body and lying in planes disposed at right angles to each other and having their opposite lateral edges disposed in parallel planes, and studs projecting from the opposite sides of the clamp head and having outer flat ends lying in said parallel planes of the flanges.

3. A C-clamp comprising a web body having an inner edge bead terminating in an anvil in one end of the clamp and a head at the opposite end thereof, a clamp screw mounted in the head in line with the anvil, a pair of projections extending from opposite sides of the head forming supporting studs, a flat back flange carried by said web and a flat end flange carried by said web and disposed at right angles to the back flange, said flanges and said studs extending from the opposite sides of the clamp beyond the anvil and other portions of the clamp body and terminating in parallel planes for supporting the clamp in parallel relation to a supporting surface when the clamp is turned down relatively thereto.

4. A C-clamp comprising a body portion having an anvil in one end and a head on its other end, a clamp screw mounted in the head for cooperation with the anvil to bind work in the clamp, said head having oppositely extending studs, a back flange carried by the clamp body, an end flange carried by the clamp body in spaced relation beyond the anvil, said flanges having outer flat faces for supporting the clamp in desired angular relation upon a supporting surface, said flanges having bolt receiving notches therein for binding the flanges against the supporting surface, said flanges and studs extending laterally from the opposite sides of the clamp body and disposed in parallel planes.

5. A clamp comprising a C-shaped body having an anvil in one end and an internally threaded head on its other end, a clamp screw mounted in the head in line with the anvil for holding the work in the clamp, a pair of studs projecting from the opposite sides of said head, said clamp body having a back flange with a flat outer surface for supporting the clamp on its back, said body portion also having an end flange with an outer flat surface disposed in spaced relation to the anvil for supporting the clamp in upright position on a supporting surface, said flanges being disposed upon the clamp body in predetermined angular relation with respect to each other and the axis of the anvil and the clamp screw, said flanges having bolt receiving openings therein for binding the clamp in adjusted position against a support.

6. A clamp comprising a body portion having an anvil therein and a head in line with the anvil, a reinforcing web disposed between the anvil and head, a clamping screw mounted in the head and in line with the anvil, flanges extending in opposite directions and beyond the web and anvil, studs extending on each side of said head adapted to support said clamp in cooperation with said flanges when said clamp is resting upon its side and means adapted to square the work when positioned in said clamp.

GUSTAVE WALTER.