No. 663,343. Patented Dec. 4, 1900.

T. F. HARRIS.

CLAMP.

(Application filed June 6, 1900.)

(No Model.)

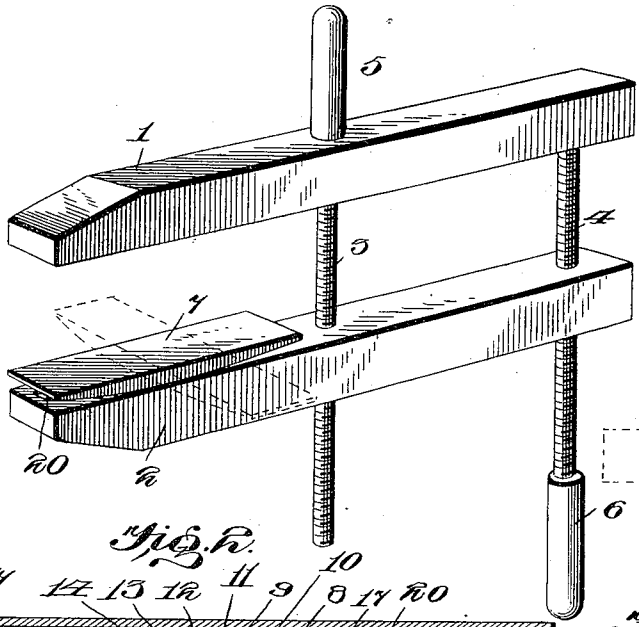


Fig. 1.

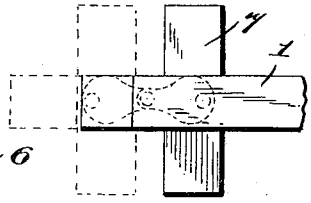


Fig. 7.

Fig. 2.

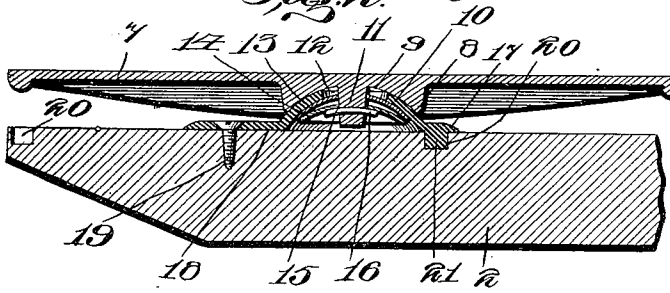


Fig. 5.

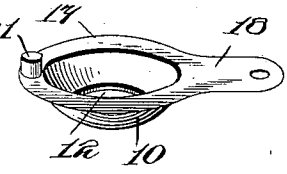


Fig. 3.

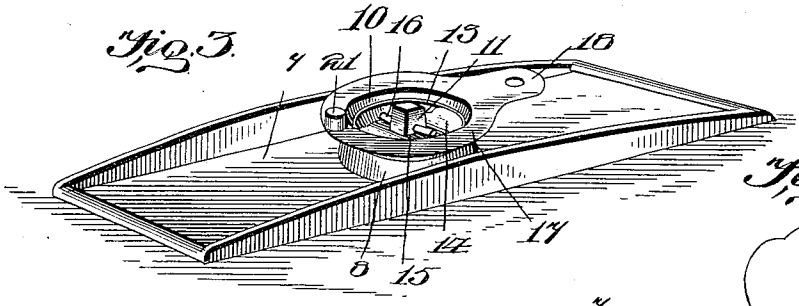


Fig. 6.

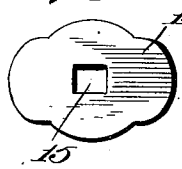
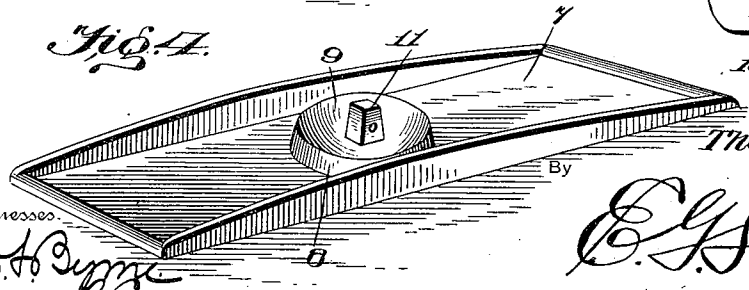


Fig. 4.



Witnesses.
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UNITED STATES PATENT OFFICE.

THOMAS F. HARRIS, OF RADFORD, VIRGINIA, ASSIGNOR OF TWO-THIRDS TO ROBERT C. McWANE, OF SAME PLACE, AND HENRY E. McWANE, OF LYNCHBURG, VIRGINIA.

CLAMP.

SPECIFICATION forming part of Letters Patent No. 663,343, dated December 4, 1900.

Application filed June 6, 1900. Serial No. 19,309. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. HARRIS, a citizen of the United States, residing at Radford, in the county of Montgomery and State of Virginia, have invented a new and useful Clamp-Jaw, of which the following is a specification.

My present invention relates to improvements in clamp-jaws, and has for its object the production of a clamp-jaw having a face-plate mounted in a peculiar manner to permit said plate to assume various axial positions and to be automatically or manually inclined in any desired degree or in any direction with respect to the jaw, in order that objects of various contours may be secured between the clamp-jaws and with a uniform application of pressure to said objects notwithstanding imperfections in the relative adjustment of the jaws of the clamp.

To the accomplishment of this object and others subordinate thereto, all as will hereinafter more fully appear, the invention consists in adjustably mounting upon the face of a clamp-jaw a hollow convex socket member upon which is snugly fitted the correspondingly concave socket of a face-plate, from the center of the socket of which extends a post or stud passed through an enlarged axial opening in the socket member and carrying a spring bearing at its opposite ends against a concavo-convex friction plate or washer seated against the inner face of the socket member and shiftable therein with the stud or post as the position of the latter is changed under the automatic or manual adjustment of the face-plate.

The invention consists, further, in certain structural details to be hereinafter described, illustrated in the accompanying drawings, and defined in the appended claims.

In the drawings, Figure 1 is a perspective view of a wood-clamp equipped with my face-plate. Fig. 2 is a sectional view, on a somewhat-enlarged scale, through one of the clamp-jaws with my face-plate mounted thereon. Fig. 3 is a perspective view of the face-plate and its mounting in an inverted position. Fig. 4 is a view similar to Fig. 3, with the socket member, friction-cup, and spring removed. Fig. 5 is a detail perspective view of the socket member. Fig. 6 is a detail view of the spring, and Fig. 7 is a detail view illustrating the manner of adjustment of the socket member.

Referring to the numerals of reference employed to designate corresponding parts in the several views, 1 and 2 indicate the jaws of a wood-clamp, and 3 and 4 the oppositely-extending screws piercing the jaws 1 and 2 and provided with terminal handles 5 and 6, by means of which the screws are operated for the purpose of adjusting the relative positions of the jaws. In clamps of this variety, as well as in many other forms of vises, it is exceedingly difficult to maintain during their adjustment parallel relation between the opposed faces of the jaws, which is necessary in order to have them contact uniformly throughout the surfaces of the object clamped between them. It is in recognition of this fact that my present improvement in this class of devices has been produced.

My primary purpose is, as stated, to provide a universally-adjustable face-plate 7, constituting the contact-face of one of the jaws—for instance, the jaw 2—and preferably of oblong shape, as shown, in order that it may be presented in substantial alinement with the jaw or at right angles thereto or in any intermediate position, as may be necessary in order to properly adjust the face-plate to retain objects of various forms.

In order to obtain the desired adjustment of the face-plate 7, I provide the latter upon its inner face with a central enlargement 8, provided with a socket or concavity 9, having the contour of a sphere-section and conforming to and fitting upon a hollow convex socket member 10, which, with the socket 9, constitutes, in effect, a ball-and-socket joint intermediate of the jaw and face-plate. From the center or axis of the socket 9 extends in the direction of the jaw a stud or post 11, passing through an enlarged axial opening 12 in the socket member and carrying a concavo-convex or cup-shaped friction-disk 13, having an axial opening conforming to the contour of the post and retained in frictional engagement with the interior face of the socket member 10 by a plate-spring 14, like-

wise provided with a square opening 15 for the reception of the post and retained in active engagement with the friction-disk by a transverse locking-pin 16, piercing the post 11 transversely and serving to retain the members of the joint in their assembled positions.

It will now be seen that the spring 14 will exert its pressure to clamp the quadraspherical wall of the socket member between the concave face of the socket and the opposed face of the friction disk or cup, or, more properly speaking, to draw the socket of the plate into close engagement with the wall of the socket member and to urge the friction cup or disk against the interior face of said member. In order that while the face-plate 7 may be tilted in any direction by reason of its universal connection, it will be held in any position it has assumed until sufficient force has been exerted upon the base-plate to overcome the resistance opposed by said spring.

It will now be seen that in order to adjust the device for the purpose of securely clamping two pieces of wood, for instance, the handles of the screws are grasped one in each hand and the clamp is then turned end over end until the jaws are given an approximate adjustment. They are then presented at the opposite sides of the object to be clamped and the jaws are firmly clamped through the manipulation of the screw 4. These adjustments of the jaws cause them to be clamped firmly upon the interposed object; but, as stated, it is difficult to maintain the parallel relation between said jaws, and they do not therefore engage squarely with the plain surfaces of the object clamped. Uniform engagement of the jaws with an object having angularly-related faces is obviously an impossibility; but it will be seen that by the employment of my face-plate the latter will automatically conform to the face of the interposed object, and a uniform pressure will be exerted thereon by the jaws, notwithstanding the location of said jaws out of parallel or the angular relation of the opposite faces of the object clamped, as the said plate will automatically assume any angular position which may be necessary to obtain a firm uniform bearing.

Obviously the face-plate may be moved axially to a position at right angles to the jaw 2 where such position is necessary to properly clamp the object or when it is desired to use the ends of the jaws directly for the retaining of small objects. I desire, however, to provide a still further range of adjustment, intended, primarily, for the purpose of removing the face-plate to a considerable distance from the end of the jaw 2 or for restoring it to its original position, as required by the contigencies of use. To effect this end, I provide the socket membor 10 with a base-plate comprising an annular flange 17, said flange being extended radially at one point to form an elongated tongue or bearing-lug 18, through which a securing-screw 19 is passed in a manner to permit the socket member to be swung with the screw 19 as an axis to various positions upon the jaw 2, which latter is provided with a series of openings 20 for the reception of a securing-lug 21, extending from the face of the flange 17 at a point diametrically opposite the tongue 18.

From the foregoing it will be seen that by reason of the peculiar form of mounting of the face-plate 7 the latter may be tilted universally for the purpose of effecting the angular adjustment of its face with respect to the face of the jaw, that said plate may be shifted axially to present it at right angles to the jaw, that provision is made for shifting the mounting of the plate bodily from one position to another upon the jaw, and that means are provided for adjustably retaining the plate-mounting upon the jaw and for yieldingly retaining the plate in its various angular and axial positions; but, while the present embodiment of my invention appears at this time to be preferable, I do not limit myself to the structural details defined, but reserve the right to effect such changes, modications, and variations as may fall properly within the scope of the protection prayed.

What I claim is—

1. The combination with a clamp-jaw, of a face-plate adjustable to various positions upon the face of the jaw and capable of adjustment without dislocation from such positions.

2. The combination with a clamp-jaw, of a member adjustable to different positions upon the face thereof, and a face-plate adjustable upon the member.

3. The combination with a clamp-jaw, of a pivoted member upon the jaw, and a face-plate connected to the member at a point eccentric to the axis thereof.

4. The combination with a clamp-jaw, of a pivoted member upon the jaw, and a face-plate mounted eccentrically upon the member and capable of rotary and tilting movement.

5. The combination with a clamp-jaw, of a pivoted member upon the jaw, a face-plate mounted eccentrically upon the member and capable of rotary and tilting movement, and independent means for retaining the member and face-plate in their adjusted positions.

6. The combination with a jaw and a face-plate, of a member carried by one of said elements and having an axial opening, an enlarged axial post extending from the other element through the axial opening and of less diameter than the diameter of the opening to permit lateral movement of the member, and means for retaining said post.

7. The combination with a jaw, and a face-plate, of a hollow convex socket member carried by one of said elements and having an enlarged axial opening, and a concave socket formed in the other element and provided with an axial post extending into the concave socket member, and means for drawing the

socket and socket member into frictional contact.

8. The combination with a clamp-jaw and a face-plate, of an axially-apertured, convex socket member carried by one of said elements and a concave socket formed in the other element, a post extending axially from the socket and into the socket member, and a reactive element, as for instance, a spring carried by the post and located within the socket member to yieldingly retain the face-plate against movement.

9. The combination with a clamp-jaw, and a face-plate, of a hollow convex socket member carried by one of said elements, a concave socket formed in the other element, a post extending axially from the socket and into the socket member, a friction-disk opposed to the interior face of the socket member, and means carried by the post for yieldingly urging said disk into frictional engagement with the socket member to retain the face-plate in its adjusted positions.

10. The combination with a clamp-jaw and a face-plate, of a hollow convex socket member carried by the jaw and having an enlarged axial aperture, a concave socket formed in the face-plate and having an axially-extending post passed into the socket member, a cup-shaped friction-disk revoluble with the post and disposed against the interior face of the socket member, and a spring carried by the post and bearing against the periphery of the disk to yieldingly retain the face-plate in its adjusted positions.

11. The combination with a clamp-jaw, of a socket member, means permitting the adjustment of said socket member upon the face of the jaw, the face-plate carried by the socket member and capable of rotary and angular movement, and means for retaining the face-plate in its various adjustments.

12. The combination with a clamp-jaw, of a convex socket member pivotally connected at an eccentric point to the face of the jaw, means for retaining said socket member in its adjusted positions on said jaw, and an adjustable face-plate carried by the socket member.

13. The combination with a clamp-jaw, of a hollow convex, axially-apertured socket member, a lug and a tongue disposed at opposite sides of the member, means for pivotally mounting the tongue upon the jaw, a face-plate provided with a central enlargement formed with a concave socket having an axially-extended post passed into the hollow socket member, a cup-shaped friction-disk carried by the post and engaging the interior face of the socket member, a spring likewise carried by the post, and means for retaining the spring in active engagement with the periphery of the friction-disk, the face of the jaw being provided with a series of recesses for the reception of the lug extending from the socket member, whereby said member adjustably supports the face-plate and is in turn adjustably supported by the jaw.

14. The combination with a clamp-jaw, of a face-plate adjustable to various positions upon the face of the jaw and capable of rotary movement while occupying such positions, said face-plate having a width substantially corresponding to the width of the jaw and being of greater length than its width, whereby said face-plate may be positioned to conform to the face of the jaw at one end or may be projected beyond the end of said jaw or beyond the opposite sides thereof.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOS. F. HARRIS.

Witnesses:
A. P. MONTAGUE,
W. B. FUQUA.