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CLAMP FOR USE IN VULCANIZING

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Fig. 1

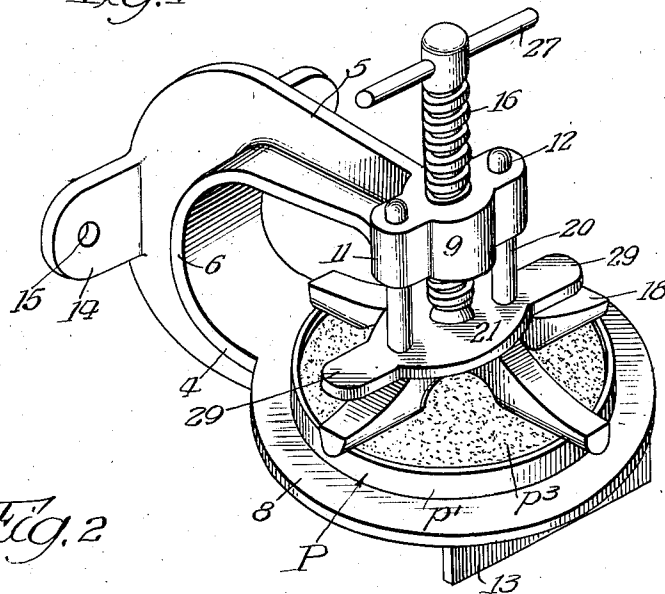


Fig. 2

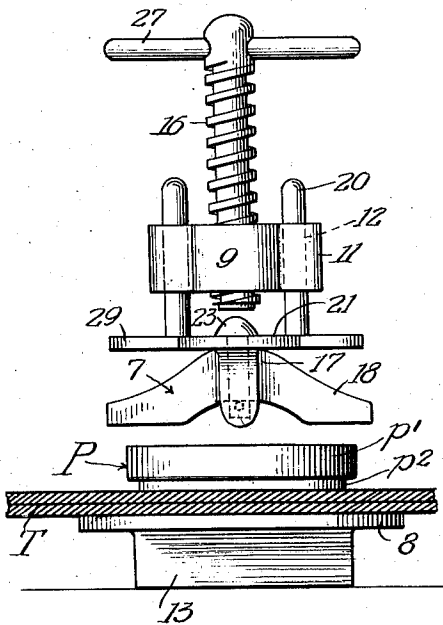
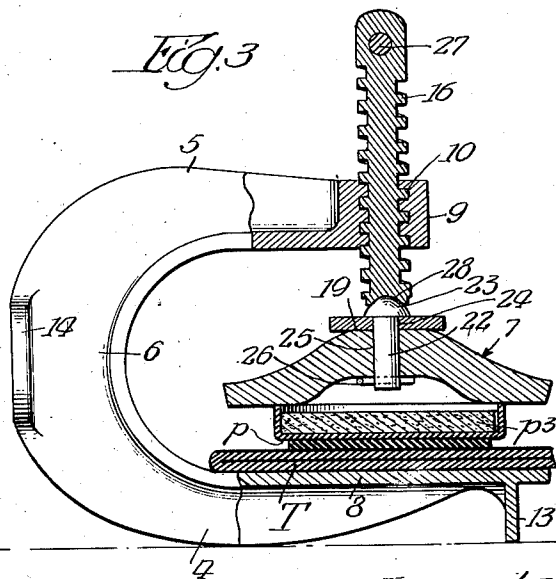


Fig. 3



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UNITED STATES PATENT OFFICE

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CLAMP FOR USE IN VULCANIZING

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6 Claims. (Cl. 18—18)

The present invention relates generally to C-clamps for use in vulcanizing rubber patches on punctured or otherwise damaged tire tubes. More particularly the invention relates to that type of C-clamp which is designed primarily for use with a cup-shaped metallic platen having on the bottom thereof an uncured rubber patch with a vulcanizing agent therein and over the bottom and within its side wall a fuel disk for providing heat for patch vulcanizing purposes, has an enlarged tube supporting part on the lower arm thereof, and embodies a clamping spider which is associated with a screw extending through a vertical internally threaded socket in the outer end of the upper arm, and is adapted after being brought into engagement with the side wall of the platen and in response to turning of the screw in a clamping direction to hold the rubber patch in clamped relation between the platen and the tube.

It has heretofore been customary in the manufacture or fabrication of a C-clamp of this type to attach the clamping spider to the lower end of the screw by way of a swivel connection so that it is movable vertically with the screw. In practice it has been found that although a clamp of this character fulfills in an effective manner its intended purpose clamping of the platen cannot be quickly accomplished and difficulty in centering the platen with respect to the clamping spider often occurs due to the fact that the spider has to be lowered by turning of the screw and the platen cannot be centered with respect to the spider until the latter is brought by turning of the screw into substantially abutting relation with the platen side wall.

One object of the invention is to provide a C-clamp of the type under consideration which is an improvement upon and can be operated more quickly and with greater facility than previously designed clamps for the same purpose and of like general character by reason of the fact that the clamping spider thereof instead of being attached by a swivel connection to the lower end of the screw is mounted for vertical sliding movement independently of the latter and hence may be slid downwards into engagement with the side wall of the platen without manipulation of the screw and the platen may be readily centered with respect thereto.

Another object of the invention is to provide a C-clamp of the last mentioned character in which the mount whereby the clamping spider is vertically slidable relating to the screw consists of a pair of rods which are positioned on opposite sides

of the screw and project through and fit slidably within sockets in a pair of lugs at the sides of the internally threaded socket in the outer end of the upper arm of the clamp.

A further object of the invention is to provide a clamp of the type and character under consideration in which the clamping spider is provided at its upper end with a plate which carries the rods and embodies a pair of oppositely extending finger receiving ears whereby the spider may be held or forced downwards against the side wall of the platen and held against turning by the screw while the screw is being turned into a position wherein it serves to hold the spider in clamped relation with the platen.

A still further object of the invention is to provide a C-clamp which is generally of new and improved construction and may be manufactured at a low and reasonable cost.

Other objects of the invention and the various advantages and characteristics of the present C-clamp will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a perspective of a C-clamp embodying the invention, showing the clamping spider in its clamped position with the screw abutting thereagainst;

Figure 2 is a front view of the clamp showing the screw in its raised position and illustrating the manner in which the clamping spider is vertically slidable independently of the screw; and

Figure 3 is a view partly in side elevation and partly in section of the clamp.

The clamp which is shown in the drawing constitutes the preferred embodiment of the invention. It is of the C-type or variety and is primarily adapted for use with a cup-shaped metallic platen P in connection with vulcanization of a punctured tube T for a pneumatic tire.

The platen P consists of a circular bottom p and an upstanding annular or cylindrical side wall p^1 and has a patch p^2 on the under face of the bottom and a fuel disk p^3 on the top face of the bottom and within the side wall p^1 . The patch, as well understood in the art, is formed of uncured rubber and has a vulcanizing agent therein for vulcanizing purposes. It is adapted

to be placed against the punctured portion of the tube T, as shown in Figure 3 of the drawing, and prior to the vulcanizing step or operation and placement against the tube is covered and protected by a circular piece of Holland cloth (not shown). This piece is adapted to be removed from the rubber patch immediately before the vulcanizing operation and serves to prevent the patch from adhering to surfaces against which it is brought into contact prior to being applied to the tube. The fuel disk p^3 fits within the platen and when ignited produces sufficient heat to cause the patch p^2 to be vulcanized into adhering relation with the tube T.

The clamp comprises a lower arm 4, an upper arm 5, and a connecting piece 6 and has a clamping spider 7. The lower arm underlies the upper arm 5 and is shaped to form a circular tube supporting part 8. This part is flat and is adapted to have the portion of the tube T with the puncture or hole therein placed over it, as shown in Figures 2 and 3. The connecting piece 6 extends between and is formed integrally with the two arms 4 and 5. The upper arm has a substantially cylindrical enlargement 9 at its outer end and this enlargement has an internally threaded hole or socket 10 extending vertically therethrough and also has a pair of outwardly extending lugs 11 on opposite sides thereof. These lugs are formed integrally with the enlargement 9 and have vertically extending cylindrical holes 12. The arms and connecting piece are preferably in the form of a one-piece metal casting and are T-shaped in cross section. The lower arm 4 embodies beneath the tire supporting part 8 thereof an integral depending web 13. This web embodies a flat bottom edge and forms an elongated horizontally extending leg whereby the clamp may be supported in an upstanding position on a table or like supporting surface. The connecting piece 6 is substantially semicircular. It together with the upper and lower arms forms a C-shaped frame and has at the central or intermediate portion thereof a pair of oppositely extending ears 14. These ears have screw receiving apertures 15 therein and permit the clamp to be fixed to a wall or back-board when it is impractical or undesirable to support it on a table by use of the leg forming web 13.

The clamping spider 7 is disposed between the two arms 4 and 5 and in conjunction with a vertically extending screw 16 operates to force the platen P downwardly towards the tube supporting part 8 of the clamp in order to hold the rubber patch p^2 in clamped relation between the platen and the tube T. The spider is preferably in the form of a one-piece metal casting and embodies a hub 17 and a plurality of legs 18. The hub 17 is slightly thicker than the legs and embodies a flat top face 19. The legs 18, as shown in the drawing, extend downwardly and outwardly from the hub and are adapted to seat against or engage the upstanding cylindrical side wall p^1 of the platen P when the spider is in its operative position. The spider 7 is mounted for vertical sliding movement independently of the screw 16 by means of a pair of rods 20. These rods are carried by and extend upwardly from a plate 21 on the hub 17 of the spider. They are positioned at opposite sides of the screw 16 and fit slidably in the holes 12 in the lugs 11, as shown in Figures 1 and 2. The plate 21 is secured in place against the top face 19 of the hub by way of a vertically extending pin 22. The latter has a head 23 at its upper end and extends through

aligned or registering holes 24 and 25 in the central portion of the plate and the central portion of the spider hub. A cotter pin 26 extends through a transverse hole in the lower end of the pin and serves to retain the pin against axial displacement with respect to the spider and plate. The rods 20 are suitably attached or fixed to the plate 21 and constitute guide means whereby the spider is confined to sliding movement in a rectilinear course or path. The screw 16 extends through and interfits with the internally threaded socket 10 in the enlargement 9 at the outer end of the upper clamp arm 5 and embodies at its upper end a cross pin 27 for turning purposes. The lower end of the screw overlies the central portion of the hub 17 of the spider and embodies a recess 28. This recess is shaped conformably to the head 23 of the pin 22 and is adapted to receive the latter, as shown in Figure 3. When turned in one direction the screw 16 moves downwards into engagement with the head 23 of the pin 22 and when further turned in the same direction after engagement with the head forces the clamping spider 7 downwards and through the medium of the platen 6 operates to clamp the rubber patch p^2 against the tire tube T. When the screw 16 is turned in the opposite direction it moves upwards independently of the clamping spider and releases the latter so that it is free to be moved upwards out of engagement with the side wall of the platen. By reason of the fact that the spider is vertically movable independently of the screw 16 it is a simple matter to center the platen with respect to the spider inasmuch as in preparation for a vulcanizing operation it is only necessary after placement of the tube T on the supporting part 8 to mount the platen over the punctured portion of the tube and then after lowering the spider so that the legs thereof engage the side wall of the platen move the platen into centered relation with respect to the legs. In order to facilitate raising and lowering of the spider and also to permit the spider readily to be held against the platen during lowering of the screw 16 the plate 21 is provided with a pair of oppositely extending, finger receiving ears 29. These ears are located adjacent to the rods 20. In vulcanizing the tire tube T by way of the platen P and the clamp the tube is first placed on the circular supporting part 8 of the lower arm 4. Thereafter the platen P is positioned over the tube and the rubber patch p^2 is brought into contact with the punctured part of the tube. After so positioning the platen the clamping spider 7 is moved downwards into engagement with the side wall of the platen and the platen is centered with respect to the legs 18 of the spider. After centering of the platen with respect to the spider slight downward pressure is placed upon the platen by pressing downwards on the ears 29. While the platen is subjected to this type of pressure the screw 16 is lowered until the end thereof comes in contact with the head 23. Thereafter the operator's fingers may be removed from the ears 30 and the spider brought into firm clamped relation with the platen by further lowering the screw. After the patch p^2 beneath the bottom of the platen P has been placed under the proper or desired clamping pressure the fuel disk p^3 is ignited so the vulcanizing operation is commenced as well understood in the art. At the conclusion of the vulcanizing step or operation the screw 16 is raised by reversely turning it. After raising of the screw the spider is free so that it may be

raised out of engagement with the platen in order to release the latter.

The herein described clamp is simple as far as construction is concerned and may be manufactured at a low and reasonable cost. In addition, it not only effectively serves its intended purpose but permits of ready centering of the platen with respect to the clamping spider and quick clamping of the spider against the platen. The thread of the screw 16 is preferably of the type shown in the drawing so that raising and lowering of the screw may be obtained by but a comparatively few turns.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

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

1. As a new article of manufacture, a clamp adapted for use with a fuel retaining platen with a patch on the bottom thereof in vulcanizing the patch on a punctured tire tube, and comprising a C-shaped frame having a lower arm with an enlarged part for supporting the punctured portion of the tube with the patch and platen thereabove and having an upper arm disposed directly over the lower arm and provided with a vertically extending internally threaded socket and a vertical hole at one side of the socket, a clamping spider positioned between the two arms of the frame and adapted to overlie the platen, and an upwardly extending rod on the spider fitting slidably within the hole and forming a connection between the spider and the frame whereby the former is permitted to move vertically and be lowered into engagement with the platen, and a screw extending through and interfitting with the socket in the upper frame arm and adapted when turned in one direction and after lowering of the spider into engagement with the platen to move downwardly into contact with the spider and cause the latter to clamp the platen and patch against the tube and when turned in the reverse direction to move upward out of contact with the spider and release the latter.

2. As a new article of manufacture, a clamp adapted for use with a fuel retaining platen with a patch on the bottom thereof in vulcanizing the patch on a punctured tire tube, and comprising a C-shaped frame having a lower arm with an enlarged part for supporting the punctured portion of the tube with the patch and platen thereabove and having an upper arm disposed directly over the lower arm and embodying a vertically extending internally threaded socket therethrough and a pair of vertical holes at the sides of the socket, a clamping spider positioned between the two arms of the frame and adapted to overlie the platen, a pair of upwardly extending rods attached to and projecting upwardly from the spider and fitting slidably within the holes respectively so as to form a connection between the spider and the upper arm of the frame whereby the spider is permitted to be moved vertically and to be lowered into engagement with the platen, and a screw extending through and interfitting with the socket in the upper arm or frame and adapted when turned in one direction and after lowering of the spider into engagement with the platen to move downwardly into contact with the spider and cause the latter to clamp

the platen and patch against the tube and when turned in the reverse direction to move upwards out of contact with the spider and release the latter.

3. As a new article of manufacture, a clamp adapted for use with a fuel retaining platen with a patch on the bottom thereof in vulcanizing the patch on a punctured tire tube, and comprising a C-shaped frame having a lower arm with an enlarged part for supporting the punctured portion of the tube with the patch and platen thereabove and having an upper arm disposed directly over the lower arm and embodying a vertically extending internally threaded socket therethrough and a pair of vertical holes at the sides of the socket, a clamping spider between the two frame arms adapted to overlie the platen and comprising a plurality of outwardly and downwardly extending platen engaging legs and a plate above the legs, an upwardly extending rod on the plate fitting slidably within the hole and the upper frame arm and forming a connection between the spider and the upper arm of the frame whereby the former is permitted to be moved vertically and to be lowered into engagement with the platen and a screw extending through and interfitting with the socket and adapted when turned in one direction after lowering of the spider into engagement with the platen to move downwardly into contact with the spider and cause the spider to clamp the platen and patch against the tube and when turned in the reverse direction to move upwards out of contact with the spider and to release the latter.

4. As a new article of manufacture, a clamp adapted for use with a fuel retaining platen with a patch on the bottom thereof in vulcanizing the patch on a punctured tire tube, and comprising a C-shaped frame having a lower arm with an enlarged part for supporting the punctured portion of the tube with the patch and platen thereabove and having an upper arm disposed directly over the lower arm and provided with a vertically extending internally threaded socket and a vertical hole at one side of the socket, a clamping spider between the two arms of the frame adapted to overlie the platen embodying a hub with a vertical hole therein, a plurality of platen engaging means extending outwardly from the hub, a plate fitting against the top of the hub, and a pin with a head at its upper end extending between the plate and the hole in the top of the hub, and serving to hold the platen and spider in clamped relation, an upwardly extending rod on the plate fitting slidably within the hole and the upper frame arm and forming a connection between the spider and the upper arm of the frame whereby the former is permitted to be moved vertically and to be lowered into engagement with the platen and a screw extending through and interfitting with the socket and adapted when turned in one direction after lowering of the spider into engagement with the platen to move downwardly into contact with the head of the pin and cause the spider to clamp the platen and patch against the tube and when turned in the reverse direction to move upwards out of contact with the spider and to release the latter.

5. As a new article of manufacture, a clamp adapted for use with a fuel retaining platen with a patch on the bottom thereof in vulcanizing the patch on a punctured tire tube, and comprising a C-shaped frame having a lower arm with an enlarged part for supporting the punctured

portion of the tube with the patch and platen thereabove and having an upper arm disposed directly over the lower arm and embodying a vertically extending internally threaded socket therethrough and a pair of vertical holes at the sides of the socket, a clamping spider between the two arms of the frame adapted to overlie the platen and comprising a hub, a plurality of platen engaging legs projecting outwardly from the hub and a plate fixed to the top portion of the hub, a pair of upwardly extending rods attached to and projecting upwardly from the plate and fitting slidably within the holes respectively so as to form a connection between the spider and the upper arm of the frame whereby the spider is permitted to move vertically and to be lowered into engagement with the platen, and a screw extending through and interfitting with the socket in the upper frame arm and adapted when turned in one direction after lowering of the spider into engagement with the platen to move downwardly into contact with the spider.

6. As a new article of manufacture, a clamp adapted for use with a fuel retaining platen with a patch on the bottom thereof in vulcanizing

the patch on a punctured tire tube, and comprising a C-shaped frame having a lower arm with a part for supporting the punctured portion of the tube with the patch and platen thereabove and having an upper arm over said lower arm, a clamping spider between the two arms of the frame adapted to overlie the platen and comprising a plurality of outwardly extending platen engaging legs and an elongated plate disposed over the legs and provided with a pair of oppositely extending finger engaging handle forming ears at the ends thereof, a connection between the spider and the upper arm whereby the spider is permitted to move vertically and to be lowered into engagement with the platen, and a screw associated with the upper frame arm and adapted when turned in one direction and after lowering of the spider into engagement with the platen to move downwardly into contact with the spider and cause the latter to clamp the platen and patch against the tube and when turned in the reverse direction to move upwards out of contact with the spider and release the latter.

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