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W. DZUS

2,547,155

FLOATING FASTENER RECEPTACLE

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Fig. 1

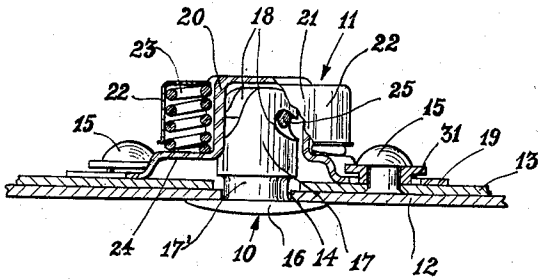


Fig. 5

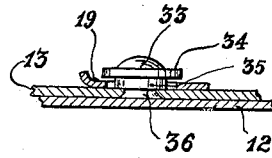


Fig. 2

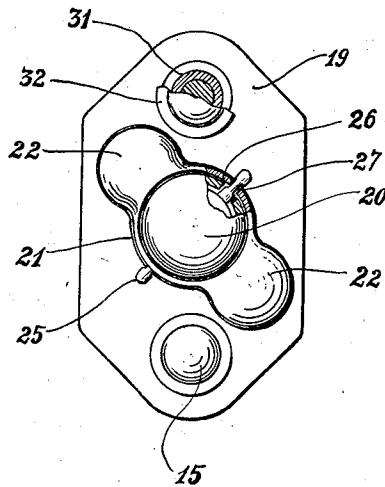


Fig. 3

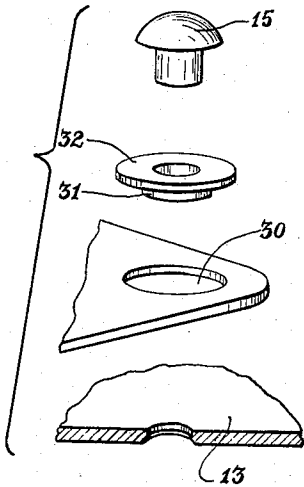


Fig. 4

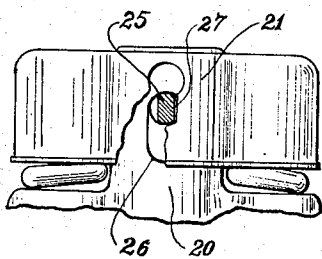
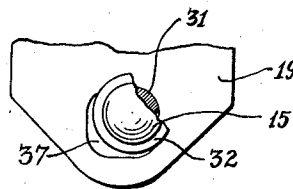


Fig. 6



INVENTOR.  
William Dzus  
BY *David H. Lane*  
ATTORNEY

# UNITED STATES PATENT OFFICE

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## FLOATING FASTENER RECEPTACLE

William Dzus, West Islip, N. Y.

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2 Claims. (Cl. 24—221)

1

This invention relates to an improved fastener receptacle of the floating type.

Fasteners of the quick-acting, self-locking type generally consist of a stud member and a receptacle member which are interengageable upon the rotation of one member with respect to the other. In the usual application, the stud member is attached for rotary motion to one of the parts to be fastened and the receptacle member is fixedly attached to the other part. In certain installations, difficulty has been encountered due to misalignment between the parts, and in order to overcome this difficulty, it has been proposed to provide floating receptacles which can have limited float or movement with respect to the part to which it is attached and thereby compensate at least in part for such misalignment. The floating receptacles heretofore provided have been relatively complicated and expensive to manufacture and have been substantially different in construction from the fixed receptacles requiring additional and costly tooling.

It is an object of the present invention to provide an improved type of floating receptacle for fasteners, which is relatively simple and inexpensive in construction and which is substantially similar in basic construction to the fixed receptacle so as to eliminate the necessity for additional, costly tooling.

A further object is the provision of an improved floating fastener receptacle which is simple to install, which will provide adequate float so as to compensate for misalignment, and which is rugged so that it will give satisfactory service for a long period of time with comparative freedom from wear.

In the accompanying drawing,

Fig. 1 is an elevational view partially in section of a fastener having a receptacle embodying my invention;

Fig. 2 is a top plan view of the fastener with portions of one of the rivet heads and bushings broken away so as to reveal the floating connection for the receptacle and also with portions of the receptacle broken away to indicate the assembly;

Fig. 3 is an exploded view showing the rivet, bushing and attaching portions of the receptacle and supporting plate;

Fig. 4 is a detailed fragmentary view of a portion of the receptacle to show the construction and assembly thereof;

Fig. 5 is a sectional view in elevation of the attaching portion of the receptacle and supporting plate showing a modified type of rivet with the bushing forming an integral part thereof; and

2

Fig. 6 is a fragmentary plan view of the attaching portion of the receptacle showing a modified form of attaching hole or aperture.

In accordance with the teachings of my invention, the receptacle is attached to its supporting part by means of fixed members such as rivets extending through an opening in the receptacle somewhat larger than the rivet so as to permit relative movement, and a suitable spacing device or bushing is provided so as to provide clearance between the head of the rivet and the receptacle so as to permit free floating thereof.

My invention is applicable to the receptacle of any type of fastening device. For purposes of illustration, I have shown it applied to a fastening device similar to that shown in my copending Patent Application Serial No. 747,194 for Fastening Device, filed on May 10th, 1947 now matured into Patent No. 2,527,408, issued October 24, 1950.

The fastener consists generally of a stud member 10 and a receptacle 11 interengageable with each other upon rotation of the stud member for approximately 90 degrees in a clockwise direction and releasable upon the rotation of the stud member for approximately 90 degrees in an anti-clockwise direction.

The fastener is used to hold together two plates or parts 12 and 13. The stud member is illustrated as applied to the plate 12 for rotary motion by being inserted through an aperture 14 which is first expanded in a well-known manner by being dimpled to receive the end of the stud and is then contracted, as shown, around the neck of the stud to retain it in place. The receptacle member is attached to the plate 13 in an improved manner by rivets 15 so as to have limited floating movement with respect to the plate.

As shown, the plate 13 is formed with an aperture in alignment with the central portion of the receptacle to accommodate the stud member and thereby permit interengagement between the stud and receptacle members.

The illustrated stud member is of the well-known, spiral cam type having a head 16, a reduced neck portion 17 and a tubular shank 17 formed with oppositely disposed spiral cam locking slots 18 extending inwardly from the end thereof.

The receptacle 11, aside from the floating feature, is of a well-known type and is fully disclosed in my aforesaid Patent No. 2,527,408. Thus, it consists of a base plate 19 formed with a central cup or shell 20 and an outer shell member 21 surrounding the shell member 20 and shiftable longitudinally with respect thereto. The shell 21 is provided with oppositely disposed tubular

3

spring housing portions 22 which serve to accommodate the helical springs 23. The springs 23 are preferably precompressed and extend between spring platforms 24 formed on the base plate 19 and the top of the spring housings 22. The shells 20 and 21 are held in assembled relationship by means of crosspin 25 which extends through longitudinal slots 26 on diametrically opposite sides of shell 20 and is formed with portions of reduced diameter adjacent its two ends which are anchored in the lower ends of keyhole slots 27 in the shell 21. Since the springs 23 are precompressed, they serve normally to urge the shell 21 outwardly with respect to the shell 20 and to shift the crossbar 25 to the upper end of the slots 26.

The crossbar 25 serves not only to retain the receptacle in assembled relationship but also serves as a locking bar. Thus, it will be seen that it extends across the inside of the receptacle so as to be engageable with the spiral cam locking slots 18 of the stud when the stud is projected into the receptacle. When the stud is rotated in a clockwise direction, the locking bar is drawn downwardly bringing with it the shell 21 against the force exerted by springs 23 until the locking bar is locked behind the shoulders of the spiral cam locking slots 18. When the stud is rotated in a counter-clockwise direction, the locking bar will be freed from the locking shoulders and will be released from the slots in the stud.

The stud and receptacle, as described, are of one well-known type and are merely illustrative of the type of fastener to which my invention is applicable.

My invention is concerned primarily with the structure and arrangement of the mechanism for attaching the receptacle to the supporting plate 13 so that it may freely float or shift with respect to the supporting plate within predetermined limits. Thus, referring to Figs. 1 to 4, it will be seen that the base plate 19 of the receptacle is provided with a pair of apertures 30 adjacent opposite ends thereof for accommodating the attaching rivets 15. The apertures are somewhat larger than the diameter of the rivet body so as to permit relative movement of the receptacle in all directions laterally with respect to the rivet. However, if the rivet were tightly riveted in place, it will be appreciated that the friction between the head of the rivet and the base plate of the receptacle would prevent or interfere with the floating movement of the receptacle. In order to give the necessary clearance, I provide tubular spacers 31 which snugly embrace the rivets and are somewhat shorter than the rivet body extending between the attaching plate 13 and the under surface of the head of the rivet 15. The spacers are provided with circumferential flanges 32 at the upper end thereof projecting beyond the heads of the rivets and which are larger in diameter than the apertures 30. The body of the spacer is somewhat smaller in diameter than the aperture 30, and the length of the body of the spacer is somewhat greater than the thickness of base plate 19. In this manner, when the rivet and spacer are assembled with the receptacle in the manner shown, the receptacle is free to float or shift with respect to the supporting plate 13.

In assembling the device, the rivet 15 is first inserted through the spacer 31. The assembly is then projected through aperture 30 in the receptacle, and the projecting shank of the rivet is extended through a rivet hole smaller in diam-

4

eter than the spacer formed in the plate 13 and riveted firmly in place. Due to the fact that the length of the body of the spacer is greater than the thickness of the base plate 19 and due to the clearance between the aperture 30 and the spacer, the receptacle is free to float or shift within limits. These limits are defined by the relative size of the apertures 30 with respect to the outside diameter of the spacers 31. By increasing the size of the apertures or by decreasing the diameter of the spacers, the amount of float may be increased.

In Fig. 5, I have shown a slightly modified arrangement in which the rivet and spacer are formed in one piece. Thus, it will be seen that the rivet 33 is formed with an integral flange 34 and an integral spacer portion 35 immediately beneath the flange and of greater diameter than the shank portion 36. The relative arrangement and proportion of sizes is the same as in the rivet 15 and spacer 31, the only difference being that the spacer portion is formed integrally with the rivet. As shown in Fig. 5, the integral rivet and spacer are used in the same manner to attach the receptacle to the plate 13 for limited floating movement.

In Fig. 6, I have illustrated a modified form of attaching opening or aperture 36 in base plate 19 which, as shown, is substantially rectangular, preferably square, in shape. The corners of the aperture may be rounded or curved with a radius of curvature substantially equal to that of the spacer portion of the rivet or bushing. The rectangular apertures have the advantage over the circular apertures that they do not exert a camming action on the receptacle when torque is applied thereto as when the stud is rotated to interengage with the receptacle.

When a receptacle is made and applied to its supporting plate in the manner illustrated and described herein, it may be readily engaged with the stud member even when the plates or parts are slightly misaligned due to the fact that the misalignment can be compensated for by shifting the receptacle.

The bushing or spacer 31, as illustrated, is separable from the receptacle. However, it should be understood that it may be permanently attached thereto in any well-known manner. Also, where it is desired to use the receptacle, as illustrated herein, as a fixed rather than floating receptacle, a bushing or collar having an outside diameter equal to the diameter of the apertures 30 may be applied to the rivet 15.

It will thus be seen that I have provided an improved fastener receptacle of the floating type which is relatively simple and inexpensive in construction; which is substantially similar in basic construction to a fixed receptacle so as to eliminate the necessity for additional, costly tooling; which will provide adequate float so as to compensate for misalignment; which is simple to install and which is rugged so as to give satisfactory service over a relatively long period of time.

While I have illustrated and described my invention as applied to a receptacle of one well-known type, it will be appreciated that my invention is equally applicable to other types of fastener receptacles.

It will be understood that modifications may be made in the illustrated and described embodiments without departing from my invention as set forth in the accompanying claims.

I claim:

1. A floating fastener receptacle of the type which is engageable with a fastener stud comprising fastening means for engagement with a stud and an attaching portion formed with an attaching aperture which is substantially rectangular in shape.

2. A fastener receptacle of the type which is engageable with a fastener stud and which is adapted to be attached to a support so that it can float with respect thereto, comprising: fastening means for engagement with a stud; an attaching flange for supporting the fastening means and cooperable to rest directly on a support and formed with an attaching aperture which is rectangular in shape; and attaching means for securing the receptacle to a support consisting of a bushing formed with an outwardly projecting flange at its upper end larger than the attaching aperture and with a tubular

shank depending from the flange and of uniform smaller cross-sectional size than the attaching aperture and of somewhat greater length than the thickness of the attaching flange and a rivet having a body portion of greater length than the bushing and of a diameter to fit through the bushing and having a head for engaging the flange at the upper end of the bushing.

WILLIAM DZUS.

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