

April 12, 1949.

W. I. JONES

2,467,315

THREE-SIDE LOCK SNAP FASTENER ASSEMBLY

Filed Feb. 17, 1945

Fig. 1.

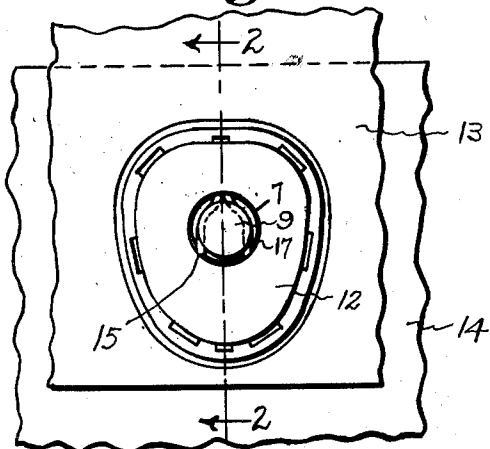


Fig. 2.

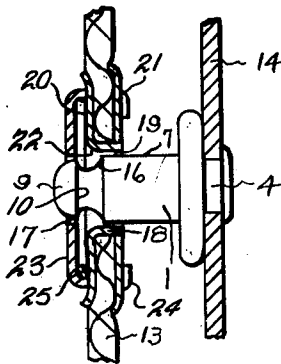


Fig. 3.

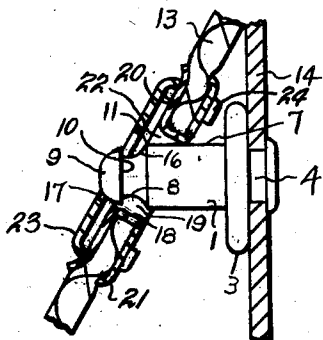


Fig. 4.

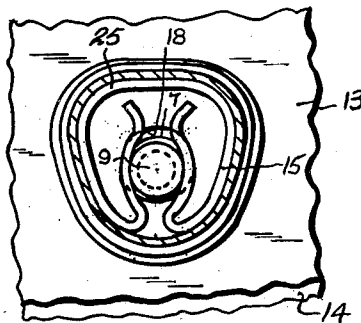


Fig. 5.

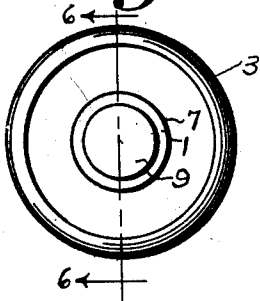


Fig. 6.

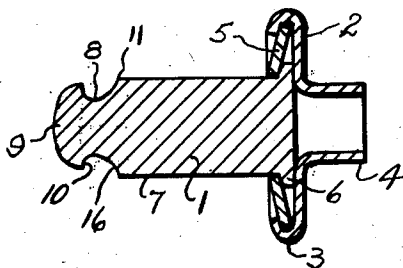
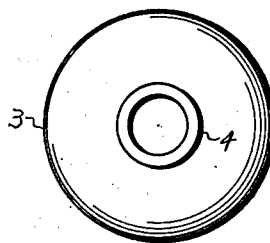


Fig. 7.



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UNITED STATES PATENT OFFICE

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THREE-SIDE LOCK SNAP FASTENER
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Application February 17, 1945, Serial No. 578,501

2 Claims. (Cl. 24-219)

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My invention aims to provide improvements in snap fastener stud members particularly useful in connection with so-called three-side lock type fasteners such as illustrated and described in the United States Letters Patent, Reissue No. 14,492, of July 9, 1918.

In the drawing which illustrates a preferred embodiment of my invention:

Fig. 1 is a front elevation of a three-side lock fastener with my improved stud as attached to a supporting structure;

Fig. 2 is a section taken on the line 2-2 of Fig. 1, the stud being shown in elevation;

Fig. 3 is a section similar to Fig. 2 but showing the position of the socket member as it is about to be released from the stud;

Fig. 4 is a front elevation of the device shown of Fig. 3 with the front face of the casing removed to show the releasing position of the fastener;

Fig. 5 is an enlarged front elevation of the stud per se;

Fig. 6 is a section taken on the line 6-6 of Fig. 5; and

Fig. 7 is a rear elevation of the stud per se.

My invention results from trouble arising in connection with previously known three-side lock fasteners. During tests made by a branch of the United States Government military service, previously known three-side lock fasteners were subjected to combat conditions under which they were contaminated with mud, clay or the like. It was found that these fasteners on gas mask carriers when worn by soldiers splashing through mud were so contaminated that they were locked against opening on the side where a pull was supposed to separate the socket from the stud. The fasteners became locked to such an extent that they could not be opened either when the foreign matter was wet or dry. This difficulty came to my attention and I was given the problem to solve.

After considerable time spent on this task, I found that the trouble was caused by the socket "dragging" relative to the stud in positive contact at certain points. Under these conditions the contaminated surfaces in contact would not permit proper tipping for separation of the parts and they were locked together. To overcome this I provided a new stud shape having a head smaller than the shank which tapered into a sharp edge with the shank and a sharp shoulder between the head and the neck. My improved shape is such that the socket may be easily tipped relative to the stud without interfer-

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ence by the foreign matter and with only a contact between the spring of the socket and the stud. Fasteners with my improved stud were subjected to the same tests as described above, and no failures have resulted. This new stud has been adopted by the Government and many hundreds of thousands are now in use.

While some previous patents may show snap fasteners of the three-side lock type with studs that, at first glance, may appear to anticipate my invention, I do not know of any instance where any previous inventor has considered the trouble described above and then constructed a stud to overcome that trouble.

Referring now to the particular structure of my invention illustrated by the drawing, I have provided a stud improvement which, for purposes of illustration, is made from three pieces. One piece of the stud is the member 1 preferably made from solid stock because the sharp shoulder between the head and the neck can be more easily provided and the sharp edge between the neck and the shank can be more easily provided than if it is made as a hollow drawn member. The stud also includes an attaching member 2 having a cup-shaped portion 3 and an eyelet 4. The third member of the stud is a washer 5 held in position by the cup-shaped member 3 which in turn overlaps the base flange 6 of the stud and holds it in assembly.

The solid member 1 has a shank portion 7 and neck portion 8, a head portion 9, a sharp shoulder 10 between the head and the neck, and a sharp edge 11 between the neck and the shank, all as shown in Figs. 2, 3, and 6 for purposes hereinafter described.

The so-called three-side lock socket 12 attached to a piece of fabric or other similar material 13 (Figs. 1, 2, 3, and 4) is of the general type more fully illustrated and described in the above-mentioned patent. The socket 12 is shown with a base member 20 and a back plate 21 disposed on opposite faces of the fabric or other material 13 with a flange or barrel 18 extending from one face of the base defining a substantially elliptical aperture 22 therein. The back plate 21 is provided with a substantially elliptical aperture 19 in line with the aperture 22 of the base. Adjacent a face of the base member 20 is a substantially planar cover member 23 disposed substantially parallel to the base member 20 and provided with prongs 24 extending through the base member 20 and back plate 21 and clinched against the back plate 21 securing a stud-engaging spring member 25 between the cover member 23 and

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the base member 20. The cover member 23 is provided with an opening 17 slightly larger than the head portion 9 of the stud 1. This opening 17 is superposed over the aperture 22 of the base member 20 and has a portion of its edge in line with a portion of the edge of the aperture 22 of the base member 20 at the end of the major diameter of the base member aperture 22. The spring member is provided with a pair of substantially parallel stud-engaging legs 15 disposed adjacent opposite ends of the minor diameter of the base member aperture 22.

When the stud is attached to a support 14 by the rivet 4 as illustrated in Fig. 2, and the socket is snapped into engagement with the stud, the normal relation of the parts is as shown in Figs. 1 and 2. When the socket is tipped relative to the stud as shown in Fig. 3, the legs 15 of the spring in the socket are spread mainly by a camming action which takes place between the legs of the spring and the tapered portion 16 of the neck forced between the legs of the spring, thus opening the legs of the spring so that the head may easily pass from between them as shown by Fig. 4. This camming action is assisted by the fact that the full diameter of the shank of the stud due to the sharp edge 11 is brought quickly into play and less tipping is required than would be the case if a curved fillet was provided at the joint between the neck and the shank. The head being slightly smaller than the shank as to diameter and being pancake shape as illustrated, can pass between the legs 15 of the spring and out from the opening through the socket without contact between the head and any part of the socket other than the spring. This pancake shape of the head which I have found should be such that the height of the head is less than half the dimension of the diameter is particularly important and prevents any "drag" or contact during separation of the fastener.

The diameter of the head of the stud is less than the diameter of the shank of the stud to provide more clearance between the head of the stud and the casing of the socket to permit free separation and prevent contact with the casing of the socket. The sharp shoulder 10 of the stud was provided to overcome too easy separation of the fastener in its normal working conditions and to make sure that the three-side lock feature was maintained.

Thus when a fastener of my improved type is submerged in foreign matter such as mud, clay or the like or is even only slightly contaminated with foreign matter, the socket may be readily removed by a pull at the unlocking side as shown in Fig. 3 and the legs of the spring are spread apart so that the head may be easily passed between them without contact with either the front member of the socket casing near the aperture 17 or contact with the barrel portion 18 of the back plate of the socket as it passes through the aperture 19 in the back plate. This is clearly illustrated in Fig. 3 and thus any abrasive action between the stud and the socket casing when contaminated is prevented.

It was found after much study that the previous types of studs which were usually made from sheet metal and had longer heads could not pass from between the legs of the spring without contacting the front plate of the socket near the aperture 19 or the barrel 18 of the back plate without contacting either or both during the separating action. With that construction the contaminating material on the head of the stud

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would come in contact with similar material on the socket and an abrasive action resulted which would prevent any further slipping relative to the parts and actually prevent further tipping movement of the socket relative to the stud with a result that the fastener could not be separated. In other words, the parts were like two pieces of sandpaper in contact and the pressure on each was such that a sliding action could not take place.

While I have illustrated and described a preferred embodiment of my invention, reference is hereby made particularly to the claims forming a part of my application and which I believe clearly cover new and useful constructions not heretofore known in the prior art.

I claim:

1. A three-side lock snap fastener including in combination a socket member and a stud member, said socket member comprising a base member with a substantially elliptical aperture, stud-engaging means adjacent one face of said base having substantially parallel stud-engaging members disposed on opposite sides of the major diameter of said aperture and a substantially planar plate member spaced from said base member and retaining said stud-engaging means thereon, said plate member provided with an opening aligned with said aperture to receive an end of said stud member, and said stud member comprising a head, a neck, and a shank, said shank having a diameter less than the minor diameter of said aperture and said neck integrally joining said head to said shank and normally disposed in engagement with said stud-engaging members in said aperture adjacent one one of the major diameter thereof with said shank extending beyond a face of said base member opposite said stud-engaging means, said snap fastener being characterized by having said head of said stud with a diameter less than that of said shank and in a rounded outer end extending for a distance less than half the diameter of said head, said neck joining said head and said shank at opposed shoulders and tapering from the shoulder at said shank to a portion adjacent said head of substantially smaller diameter than said head, whereby upon lifting said socket member in the axial direction of said stud member toward said head and tilting the end of said socket member adjacent said one end of said aperture in said axial direction, portions of the tapered portion of said neck and of the shoulder on said shank adjacent the opposite end of said aperture are caused thereby to spread the stud-engaging members permitting said head to pass between said stud-engaging members and through said aperture without interference with adjacent portions of said base member and with a minimum of interference with any foreign matter that may be disposed on said adjacent portions of said base member.

2. A three-side lock snap fastener including in combination a socket member and a stud member, said socket member comprising a base having a stud seat on one side thereof formed by a flange defining an elliptical stud-receiving aperture, a stud-engaging spring mounted on a face of said base opposite said flange and including parallel stud-engaging arms disposed adjacent opposite ends of the minor diameter of said stud-receiving aperture, a substantially planar plate member spaced from said base and retaining the stud-engaging spring thereon, said plate member provided with an opening aligned with said socket

base aperture to receive an end of said stud, said stud comprising a head and a shank of slightly less diameter than the minor diameter of said socket base aperture and a reduced neck portion intermediate said head and shank, said head being of less diameter than said shank and having a height of less than one-half its diameter and joining said reduced neck portion by a relatively sharp edge, said reduced neck portion lying adjacent said sharp head edge and connected to said shank by outwardly tapering camming portions, said stud-engaging spring arms being adapted to engage said reduced neck portion under said sharp head edge with the shank extending into said aperture, whereby a lifting and tilting of said socket member in one direction only of the major axis of said socket opening will cause said spring arms to be engaged by said tapered camming portions of said neck adjacent said shank to spread said spring arms and permit said stud head to pass between said spread spring arms and through said socket aperture.

WALTER I. JONES.

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Certificate of Correction

Patent No. 2,467,315

April 12, 1949

WALTER I. JONES

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 37, for the words "one of" read *end of*;
and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of January, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.