No. 613,299. Patented Nov. 1, 1898.

S. F. PAUL.

FASTENING DEVICE.

(Application filed Dec. 31, 1895.)

(No Model.)

Fig. 1,

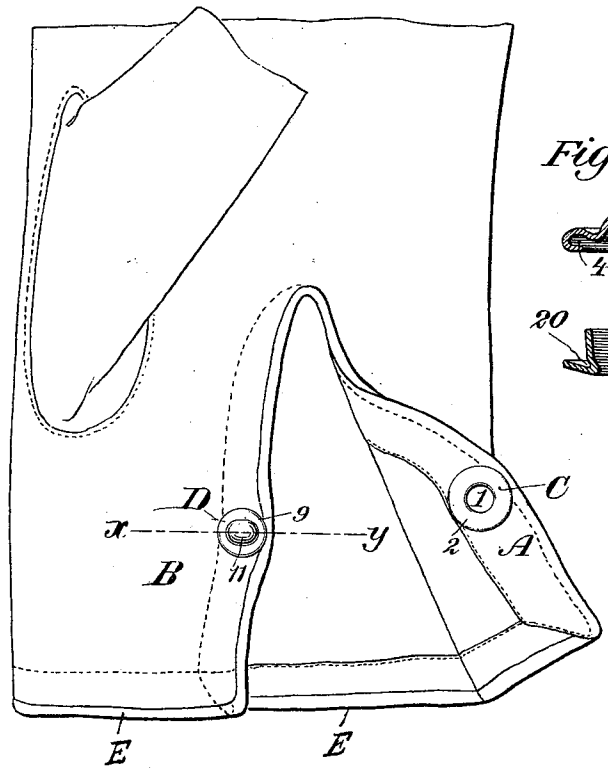


Fig. 5,

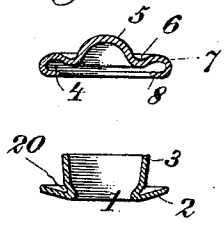


Fig. 2,

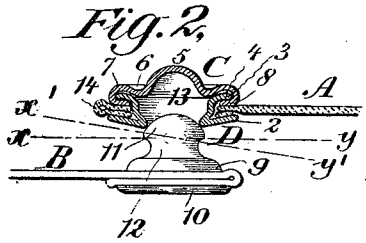


Fig. 3,

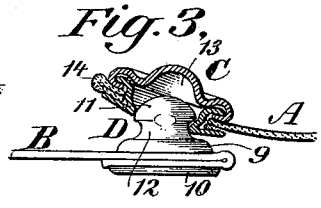


Fig. 4,

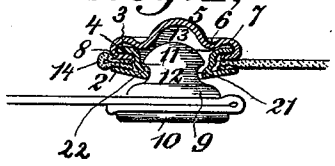


Fig. 6,

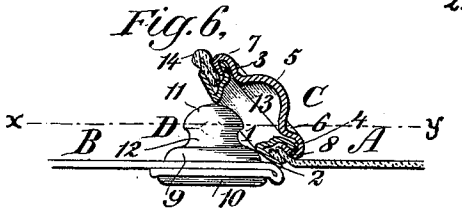


Fig. 7,



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UNITED STATES PATENT OFFICE.

SAMUEL F. PAUL, OF NEW YORK, N. Y.

FASTENING DEVICE.

SPECIFICATION forming part of Letters Patent No. 613,299, dated November 1, 1898.

Application filed December 31, 1895. Serial No. 573,870. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. PAUL, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Fastening Devices, of which the following is a specification.

Heretofore in the successful "stud-and-socket" glove-fasteners either the circular head of the stud or the circular lip surrounding the mouth of the socket has consisted of a spring, upon the uncertain and variable strength of which spring has depended the utility of the fastener.

In the following description for convenience I will treat the plane of the glove material—for example, A B, Figure 6—adjacent to the wrist-opening as horizontal, or, in other words, the plane of the surface of the wrist beneath the wrist-opening as horizontal. I will treat that part of the socket next to the wrist-opening as the front of the socket and that part of the stud next to the wrist-opening as the front of the stud.

In fastening and unfastening the wrist-opening of a glove only one hand is available, and in the use of a stud-and-socket fastener the socket is held by the thumb and finger of one hand and brought toward and over the stud, its approach being in a line extending across the wrist-opening and forming an angle with the wrist-opening varying within about forty-five degrees of a right angle. For example, the line of approach *x y* of Figs. 1, 2, and 6 of the accompanying drawings extends horizontally across the wrist-opening at very nearly right angles with the wrist-opening, the end *y* of the line of approach being, however, shown in Fig. 1 as slightly nearer the edge E of the glove than the end *x*. I have discovered that the natural way in which the finger or thumb of the one hand thus holds the socket as it approaches the stud against the strain of the elastic glove material tilts the socket substantially in the direction of this line of approach, as shown in Fig. 6, so that it is inclined to this line of approach, the front of the socket being raised and the rear of the socket depressed. I have also discovered that the natural way in unfastening with one hand is for the user to lift the front of the socket, and thus again tilt the socket in this line of approach. I have discovered that I can utilize this natural tendency of the user to tilt the socket in the direction of the line of approach both in fastening and unfastening the glove with one hand, and by so doing I can construct a fastener in which the stud and socket are substantially rigid at those points of contact which bear the strain when fastened. This strain occurs in the direction of a line which extends across the wrist-opening at an angle more or less approaching a right angle, but not necessarily exactly coincident with the line of approach before referred to.

Fig. 1 of the drawings filed herewith shows the wrist portion of a glove with my fastener shown accurately in one form and of full size. Figs. 2, 3, 4, and 6 of the drawings filed herewith represent, enlarged to twice the ordinary size for gentlemen's gloves, the stud and a vertical section of the socket viewed from a position at right angles to the line of approach, the stud and socket being represented in various relative positions. Fig. 5 is a vertical section of the two parts of the socket before being clenched together. Fig. 7 is a view of the stud, taken from a point in the line of approach.

A and B are the two parts of the glove separated by the wrist-opening of the glove that are to be fastened together, the glove material being sufficiently flexible and yielding (such as properly-prepared skin) to admit of the herein-described tilting of the socket.

C is the socket member of the fastening, attached near the edge of the overlapping part A.

D is the stud member of the fastening, attached near the adjacent edge of the underlapping part B.

The socket member C may be constructed as follows: A piece of sheet metal is formed with a central opening 1, which opening may be circular, as shown. The lip surrounding said opening is substantially rigid. From this opening extends outwardly an annular flange 2, inclining upwardly from its inner to its outer edge, as shown. Above the flange 2 and integral with the same extends upwardly and outwardly an eyelet 3, which, when

clenched within the recess 4 of the cap, is of the form shown in Figs. 2, 3, 4, and 6. Before being clenched it is of the form shown in Fig. 5. The lip surrounding the mouth of the socket may be formed by giving the metal an inward downwardly-inclined crease or curvature, as shown at 20, between the flange 2 and the eyelet 3. The cap of the socket is also of sheet metal and may consist of the raised central portion 5, surrounded by the annular depression 6, which is in turn surrounded by the annular elevation 7, from which projects the downwardly and inwardly extending annular lip 8. The form of the cap, however, may be varied indefinitely. In the form shown the depression 6 and elevation 7 produce between them on the under side of the cap a proper inclined surface for causing the eyelet 3 to spread outwardly in clenching into the space 4, as shown in Figs. 2, 3, 4, and 6. The outward inclination of the eyelet 3 above the opening 1 provides room above the lip 21 22, formed around that opening by the crease 20, for the head of the stud within the socket when both the stud and the socket are in the horizontal position shown in Fig. 4. In applying the socket to the materal A the cap may be placed on top of the material and the eyelet below the material, so that when they are pressed together the eyelet passes through the material and is clenched in the space 4, so as to hold the material between the flange 2 and the lip 8, as shown.

The stud D may be constructed as follows: A piece of metal is formed with a base 9 to rest on top of the material B. This base is connected with a flange 10 below the material by any suitable well-known means, so as to compress the material between the base 9 and the flange 10 and hold the stud firmly in the position shown. 11 is a head which is of convex curvature on the top and which in horizontal outline is preferably oval or oblong, as shown in Fig. 1, and the walls of which are substantially rigid. A neck 12 of smaller diameter than the head and also substantially rigid connects the head 11 with the base 9. The head 11, neck 12, and base 9 of the stud are preferably made of one piece of metal.

Although the individual forms of the parts of the stud and socket already described, considered separately, are not necessarily essential to this invention, it is nevertheless essential that the socket-opening 1 should bear a certain relationship to the head and neck of the stud and that the relationship of these parts should also bear a certain relationship to the line of approach (a direction of which line is indicated by the broken line $x\ y$) extending across the wrist-opening, being the line in which the socket member and the stud member are brought toward each other by the finger and thumb in closing the wrist-opening, and in the direction of which line of approach the fingers naturally tilt the socket in fastening and unfastening, as already described and as shown in Fig. 6. Such relationships I will now describe.

It will be observed that in the construction illustrated and described the mouth of the socket is smaller in the direction of a line extending across the wrist-opening than the head of the stud, but is at least as large as the head transversely of said line. Therefore the stud and socket may be engaged by tilting the socket backward in the direction of said line extending across said wrist-opening, so as to insert the front of the head into the socket in advance of the rear of the head, as shown in Fig. 6; but when the socket is presented squarely to the stud, as shown in Fig. 2, the entrance to the socket-opening 1 measured on said line of approach is too small to admit the head of the stud. After the members have been fastened together, as shown in Fig. 4, the socket-opening 13, above the lip 21 22, is large enough to accommodate the head when both are in horizontal position; but the entrance 1 to the socket-opening measured on the line of approach is too small to permit the withdrawal of the head while both occupy a horizontal position. Fig. 1 shows that the head measured on a line transverse to the line of approach $x\ y$ is sufficiently narrower than the socket-entrance 1 measured on the same line to permit the head to pass when the socket is inclined to the stud, as shown in Fig. 3. The line $x'\ y'$, Fig. 2, is supposed to be in the same vertical plane with the line of approach. Measured on the line $x'\ y'$ the distance from the neck on one side of the stud to the extreme edge of the head on the opposite side is such as to pass through the entrance 1 of the socket-opening when the parts are in the inclined position shown in Fig. 3. The lip of the socket as it is passing the position shown in Fig. 3 makes a close fit with the head and neck, as shown.

When the stud and socket members are brought toward each other by the finger and thumb of one hand, the socket member naturally approaches and comes up to and against the stud member in the inclined position shown in Fig. 6. The continued pressure of the finger and thumb behind them (combined with the sliding motion between the metallic surfaces of the flange 2 and base 9 and of the lip 22 and curved head 11) guides them naturally and easily into the relative position shown in Fig. 3. Here the user naturally bears down on the top of the socket member and the parts pass into the position shown in Fig. 4. Here the line of strain is such with respect to the relative form of the opposing surfaces between the stud and the socket as to cause the parts to remain engaged notwithstanding such strain.

When the parts are fastened and under strain, as shown in Fig. 4, there will be a space at 21 between the neck and socket, and

on the opposite side the socket will bear against the neck. In unfastening, the user lifts on the edge 14 of the material, whereupon the relative inclination of the opposed surfaces of stud and socket at and about 22 (one form of which inclination is shown in Figs. 2, 3, 4, and 6 of the drawings) will produce substantially a cam action, drawing the socket forward, so as to close up the space 21, as shown in Fig. 3, and cause the parts substantially to guide themselves out of engagement without requiring any especial accuracy in the character of the pull by the user.

The inwardly-extending downwardly-inclined metallic crease 20 by being integral with the flange 2 below the material and with the eyelet 3, secured by clenching to the cap above the material, constitutes a rigid lip around the socket-entrance. This lip is thus particularly well adapted by its rigidity and security for coöperating with the rigid neck 12 of the stud, so as to bear the strain when fastened. It is also particularly well adapted to coöperate with the rigid rounded head 11 and rigid flanges 2 and 9 for the accurate guidance of the parts from the position of Fig. 6 to the position of Fig. 3. It is also particularly well adapted to coöperate with the rigid under edge of the head 11—that is, the edge at the junction of head 11 and neck 12—for the unfastening operation.

I claim—

1. In combination with a glove, a glove-fastener consisting of a stud member and an overlapping socket member located respectively on opposite sides of the wrist-opening, the mouth of the socket being smaller in the direction of a line extending across the wrist-opening than the head of the stud but being as large as the head transversely of said line; so that said head cannot pass through said mouth when presented squarely thereto, while the stud and socket may be engaged by tilting the socket backward in the direction of said line extending across said wrist-opening, so as to insert the front of the head into the socket in advance of the rear of the head, substantially as described.

2. In combination with a glove, a glove-fastener consisting of a stud member and an overlapping socket member located respectively on opposite sides of the wrist-opening, the mouth of the socket being smaller in the direction of a line extending across the wrist-opening than the head of the stud but being as large as the head transversely of said line; so that said head cannot pass through said mouth when presented squarely thereto, while the stud and socket may be engaged by tilting the socket backward in the direction of said line extending across said wrist-opening, so as to insert the front of the head into the socket in advance of the rear of the head; said socket containing below the glove material a flange 2 and integral therewith an eyelet 3 extending through the glove material with an inward crease 20 between said flange and said eyelet, substantially as described.

3. In combination with a glove, a glove-fastener consisting of a stud member and an overlapping socket member located respectively on opposite sides of the wrist-opening, the mouth of the socket being smaller in the direction of a line extending across the wrist-opening than the head of the stud but being as large as the head transversely of said line; so that said head cannot pass through said mouth when presented squarely thereto, while the stud and socket may be engaged by tilting the socket backward in the direction of said line extending across said wrist-opening, so as to insert the front of the head into the socket in advance of the rear of the head; said socket containing below the glove material a flange 2 and integral therewith an eyelet 3 extending through the glove material with an inward crease 20 between said flange and said eyelet; and said stud containing a convex head 11 integral with a neck 12 and with a flange 9 of substantially larger diameter than the head; whereby when the socket is brought in tilted position against the stud, the socket-flange 2 and crease 20 will rest respectively on the stud-flange 9 and rounded head 11, substantially as described.

4. In combination with the material B and flexible material A, a device for fastening the same together, which consists of a hollow socket member C having a constricted entrance-opening and a stud member D having a head and neck; said head being substantially as small as said entrance-opening measured transversely to the line x, y on which said members approach each other for fastening; said head being larger than said entrance-opening measured on said line of approach; and the distance from the side of the neck (meaning the side on which the socket member approaches it for fastening) to the edge of the head on the opposite side of the stud being substantially as small as said entrance-opening measured on said line of approach; whereby the socket member when inclined to said line of approach may receive said stud, substantially as described.

5. In combination with the material B and flexible material A, a device for fastening the same together, which consists of a hollow socket member C having a constricted entrance-opening and a stud member D having a neck and a head overhanging said neck in the line x y on both sides of said neck, said head being substantially as small as said entrance-opening measured transversely to the line x y on which said members approach each other for fastening; said head being larger than said entrance-opening measured on said line of approach; and the distance from the side of the neck (meaning the side on which the socket member approaches it for fastening) to the edge of the head on the opposite side of the stud being substantially

as small as said entrance-opening measured on said line of approach; whereby the socket member when inclined to said line of approach may receive said stud, substantially as described.

6. In combination with two parts of flexible material A and B, a device for fastening the same together which consists of a hollow socket member C having a constricted entrance-opening, and a stud member D having a neck 12 and a head which overhangs said neck on the side opposite that on which the socket member approaches the stud for fastening; the distance, on the line x', y', from the edge of the overhang of the head to the opposite side of the neck being nearly as large as the socket entrance-opening on said line and the head being substantially as small as said entrance-opening measured transversely to the line x, y, substantially as described.

Signed at New York, in the county of New York and State of New York, this 28th day of December, A. D. 1895.

SAMUEL F. PAUL.

Witnesses:
R. W. KING,
T. N. FOSTER.