

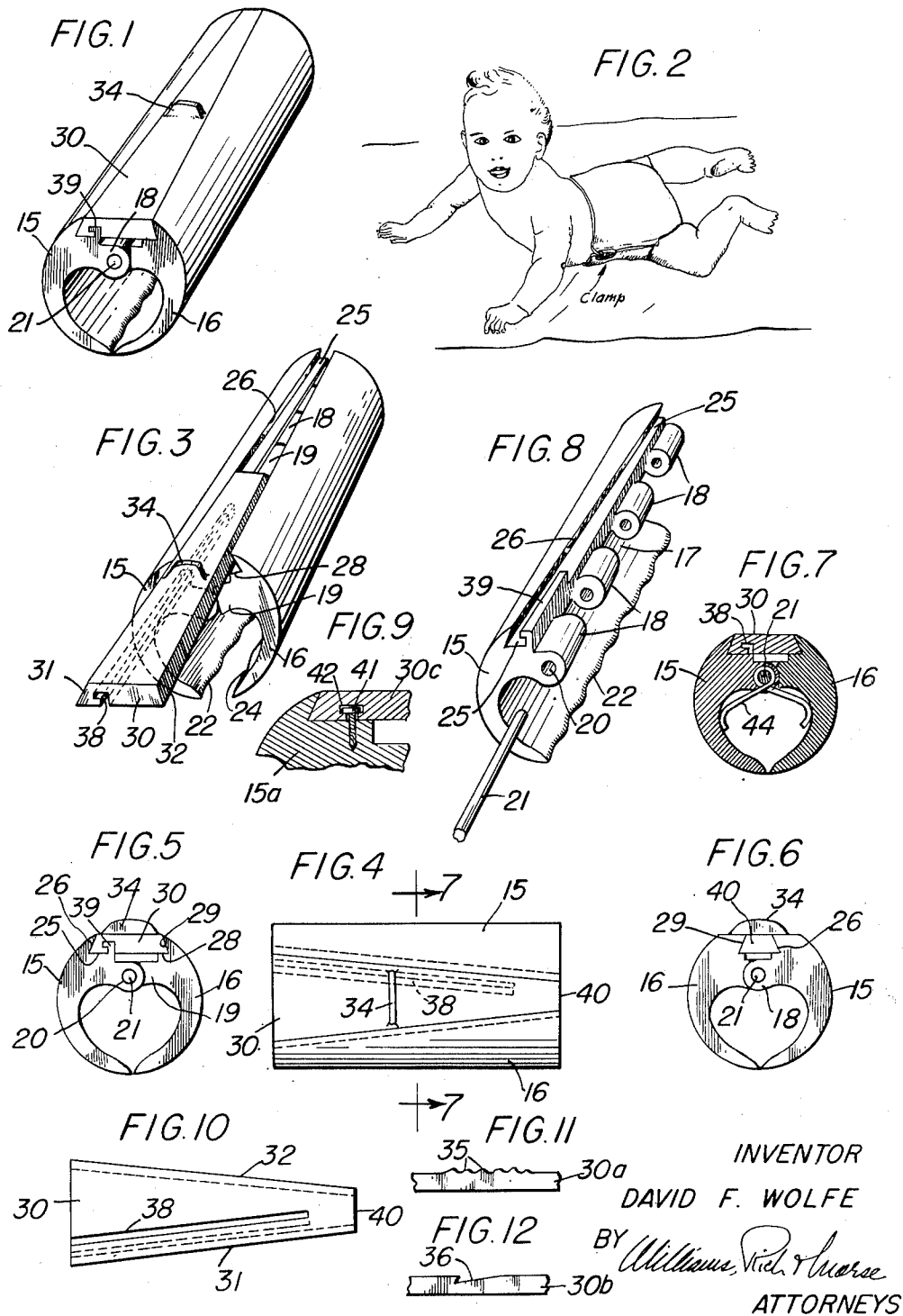
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WEDGE-ACTUATED CLAMP

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WEDGE-ACTUATED CLAMP

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3 Claims. (Cl. 24—251)

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This invention relates to fastening devices, more particularly to a novel clasp or clamp which is wedge-actuated.

An object of the invention is to provide a small, compact clamping device particularly adapted for use as a substitute for safety pins in fastening babies' diapers and other infants' clothing, bedding and the like.

Another object is to provide a clamp having a smooth, rounded external contour without any protruding parts or sharp corners on which an infant might accidentally injure himself.

A further object is to provide a clamp which may be made economically from parts of molded synthetic resins and which is capable of being washed and sterilized without corroding.

Other objects and advantages of the fastening device of the invention will in part appear and in part will be obvious from the following detailed description of the present preferred embodiment thereof, taken in conjunction with the drawings, in which:

Fig. 1 is a perspective view of a complete clamp in closed position;

Fig. 2 illustrates the clamp in use as a diaper fastening;

Fig. 3 is a perspective view showing the clamp in partially open position with its actuating wedge partially withdrawn;

Fig. 4 is a plan view of the clamp in closed position;

Fig. 5 is an end elevation as seen from the left of Fig. 4;

Fig. 6 is an end elevation as seen from the right of Fig. 4;

Fig. 7 is a section taken on the line 7—7 of Fig. 4 illustrating the jaw opening spring;

Fig. 8 is a perspective view of one of the jaws of the clamp showing one form of hinge construction and one form of means for slidably holding the wedge in place on the jaw;

Fig. 9 is a sectional detail showing an alternative means for holding the wedge in place on the jaw;

Fig. 10 is a plan view of the wedge as seen from its under side; and

Figs. 11 and 12 are side elevations of the central portions of the wedge showing modified means for gripping the wedge.

Referring to the drawings, the illustrated embodiment of the clamp of the invention comprises two jaws 15 and 16 which are longer than they are wide and generally concavo-convex in cross-section, the jaw 15 having an integral hinge element 18 extending outwardly from its concave

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side parallel to the long sides of the jaw, the jaw 16 being provided with a complementary hinge element 19 having parts fitting in the spaces 17 of the element 18. The hinge elements are perforated as shown at 20 and the two jaws are pivotally connected by means of a hinge pin 21. The pin may be secured against removal in any suitable way by upsetting its ends. The hinge elements are spaced closer to the upper edges of the jaws than to their lower edges, which are shown at 22 and 24. These lower edges are preferably formed with serrations or complementary undulations to improve the holding power of the clamp when used on such soft materials as cloth.

The shorter upper portion of each jaw, which lies above the hinge elements as shown in the drawings, is provided with a wedge-receiving seat. In the embodiment shown, the jaw 15 has a flat seat 25 terminating in an undercut upstanding side wall 26. The seat 25 is in a plane above and parallel to the hinge line and is wider at the forward end of the jaw, as shown in Fig. 8, than at the rear end. The side wall 26, which extends upwardly and inwardly, is disposed longitudinally at an angle to a plane defined by the hinge line and the lower edge 22 of the jaw. Jaw 16 is provided with a similar flat seat 28, which may be somewhat narrower than the seat 25, and with an undercut side wall 29 which has the same degree of angularity as the side wall 26 but oppositely directed so that the side walls 26 and 29 converge from one end of the clamp to the other.

Coacting with the converging side walls 26 and 29 is a wedge 30 having beveled sides 31 and 32 which converge at an angle corresponding to that formed between the side walls 26 and 29. To facilitate manipulation of the wedge, it is provided on its upper surface with a lug 34. Alternatively the lug may be replaced by a series of ridges 35 shown in Fig. 11 on the wedge 30a, or by a slight depression 36 shown on the wedge 30b in Fig. 12.

To permanently mount the wedge in the clamp so that it cannot be removed, it is attached to one of the jaws, for example by means of an L-shaped slot 38 formed in the underside of the wedge, parallel to the side 31, and engaging an L-shaped rib 39 extending a short distance inwardly from one end of the jaw parallel to the side wall 26, as shown in Fig. 8. The wedge is slipped over this rib prior to assembly of the two jaws, and since the slot 38 ends short of the small end 40 of the wedge 30 (see Fig. 10),

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the wedge cannot be wholly withdrawn from the jaws. Neither can it be removed from the jaws by moving in the opposite direction, due to the fact that when the clamp is in closed position as shown in Figs. 1, 4 and 5, the wedge reaches its maximum inward movement when the jaws are in meeting engagement.

Referring to Fig. 9, a substitute is shown for the wedge holding means just described. A headed pin 41 is fixed in the jaw 15a and its head coacts with a T-slot 42 in the wedge 30c. The pin is so located and the slot 42 is of such extent as to limit the extent of withdrawal of the wedge.

In Fig. 7 there is shown a bent wire spring 44 which surrounds the hinge pin 21 centrally of the clamp in a space provided between a pair of hinge elements. Spring 44 is so biased as to urge the jaws into open position, acting in opposition to the closing force exerted by the wedge, so that as the wedge is withdrawn the jaws will open.

From the foregoing description of the construction, the operation of the novel clamp of the invention will be apparent. Due to the gradual taper of the wedge and the corresponding convergence of the side walls with which it engages, a powerful gripping force is applied which requires very little exertion in the operation of the clamp. To open the clamp the wedge 30 is slid outwardly as far as it will go, whereupon the jaws are opened by spring 44. In the embodiment shown, the wedge remains attached to one of the jaws and the other jaw, upon being disengaged by the wedge, is capable of relative opening movement, the narrower seat on the last-mentioned jaw (seat 28, for example) clearing the adjacent side of the wedge. The material to be clamped is then inserted between the gripping edges of the clamp and the wedge is then pushed inwardly, acting on the converging side walls of the jaws to close them on the material.

It will be noted that as the wedge moves in a direction parallel to the hinge line, the relative angular relation of the walls on the jaws which it engages remains the same and hence the wedge at all times has a line contact with the jaws which distributes the strain, whereas in prior devices having wedges which move in a plane perpendicular to the hinge line the angle between the jaw parts which engage the wedge is constantly changing and can be in alignment with the sides of the wedge in only one position.

The clamp herein described is particularly designed for use as a diaper fastening. Its rounded contour and the absence of sharp elements or projections makes it a safe fastening for this purpose. Made of plastic, it is readily washable and will not corrode. The only parts requiring the use of metal are the hinge pin and spring and these may be made of or plated with corrosion resistant metals. It is not limited to use as a diaper fastener, of course, but may be used as a blanket holder, tie clasp or for any other purpose where clamping is desired.

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The invention is not to be construed as limited to the precise details of construction illustrated and described since various modifications thereof may be made within the scope of the invention as defined in the appended claims.

What is claimed is:

1. A clamp comprising a pair of opposed jaws of greater length than width, an integral hinge element extending outwardly from the inner face of each jaw parallel to and intermediate its longer sides, the opposed portions of each jaw on one side of said hinge elements having longitudinally extending converging wedge-receiving seats, said hinge elements being rotatably interconnected, a wedge slidable in a direction parallel to the axis of rotation of said hinge elements and coacting with said seats to move the portions of said jaws on the other side of said hinge elements toward one another, and means slidably attaching said wedge to one of said jaws.

2. A clamp comprising a pair of opposed jaws of greater length than width, an integral hinge element extending outwardly from the inner face of each jaw parallel to and intermediate its longer sides, the opposed portions of each jaw on one side of said hinge elements having longitudinally extending converging wedge-receiving seats, said hinge elements being rotatably interconnected, a wedge slidable in a direction parallel to the axis of rotation of said hinge elements and coacting with said seats to move the portions of said jaws on the other side of said hinge elements toward one another, said wedge having on its under side an angular slot parallel to one edge, and an element on one of said jaws having a head engaging said slot to slidably secure the wedge against removal.

3. A clamp comprising a pair of complementary jaws of greater length than width, an integral hinge element extending outwardly from the inner side of each jaw parallel to its longer side and dividing it into portions of unequal width, the shorter portion of each jaw having a longitudinally extending angularly disposed wedge-receiving seat including an undercut side-wall, a hinge pin extending through said hinge elements, and a wedge having bevelled edges adapted to engage said side walls and slidable in a direction parallel to said pin and coacting with said seats to force the longer portions of said jaws toward one another.

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