

[54] **SEPARABLE FASTENING DEVICE**
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 403/353; 248/223; 224/26 R; 224/5 H
 [51] Int. Cl. **A44b 17/00**
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 24/230 TC, 230 NP, 201 A; 248/223; 224/5
 E, 26 R

[56] **References Cited**
UNITED STATES PATENTS
 3,365,756 1/1968 Bayon 24/201 A

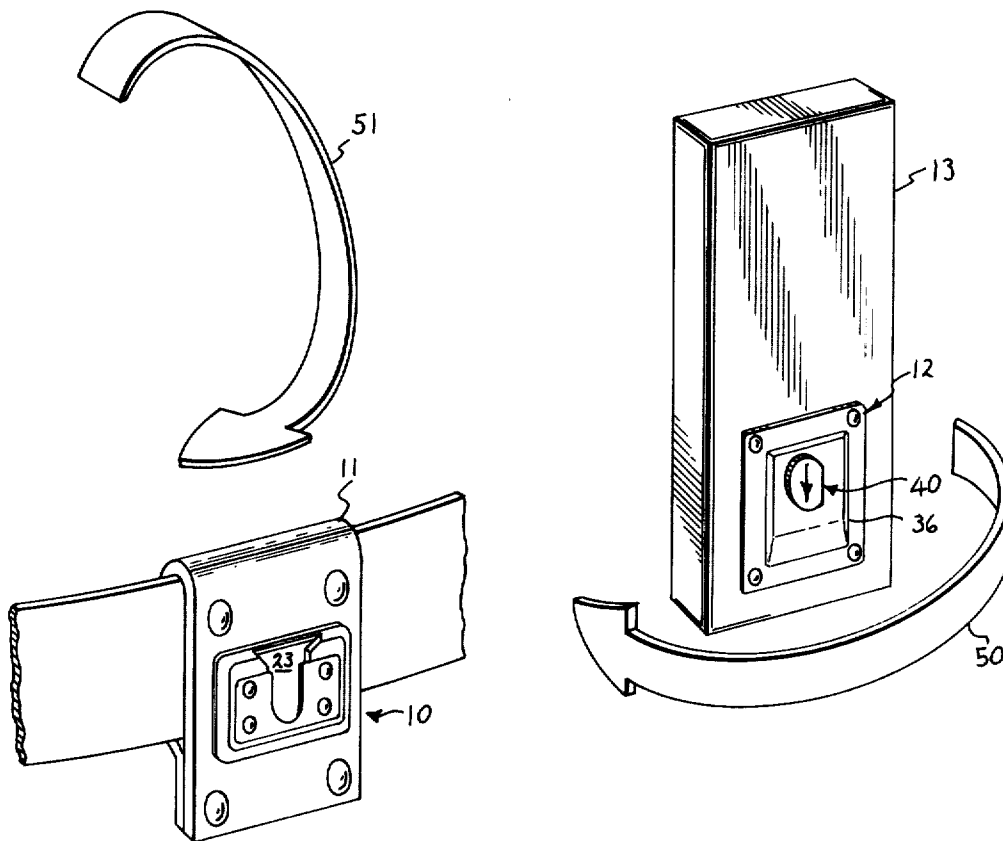
3,743,147 7/1973 Wilczynski 24/221 R
 3,797,717 3/1974 Collins 224/26 R

Primary Examiner—Bernard A. Gelak

[57] **ABSTRACT**

Two objects are fastened together by a device having a base plate with a cavity and an overhanging holder plate fastened to one object, and having a cylindrical stud with an overhanging flange fastened to the other object. The cavity, holder plate, stud, and flange are shaped so that the two objects must be oriented in a particular relation in order that the stud flange can be inserted into the cavity. After insertion, a slight relative rotation of the two objects fastens the two objects together in a pivotal relation.

4 Claims, 7 Drawing Figures



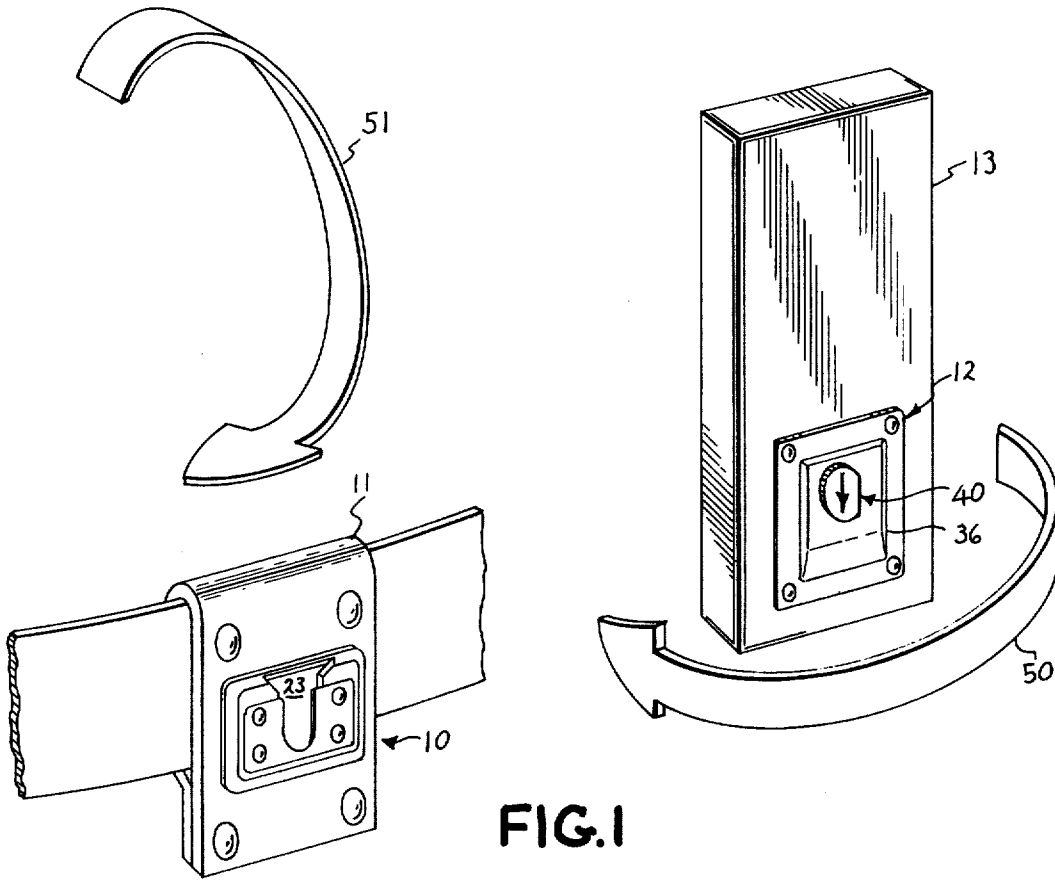


FIG. 1

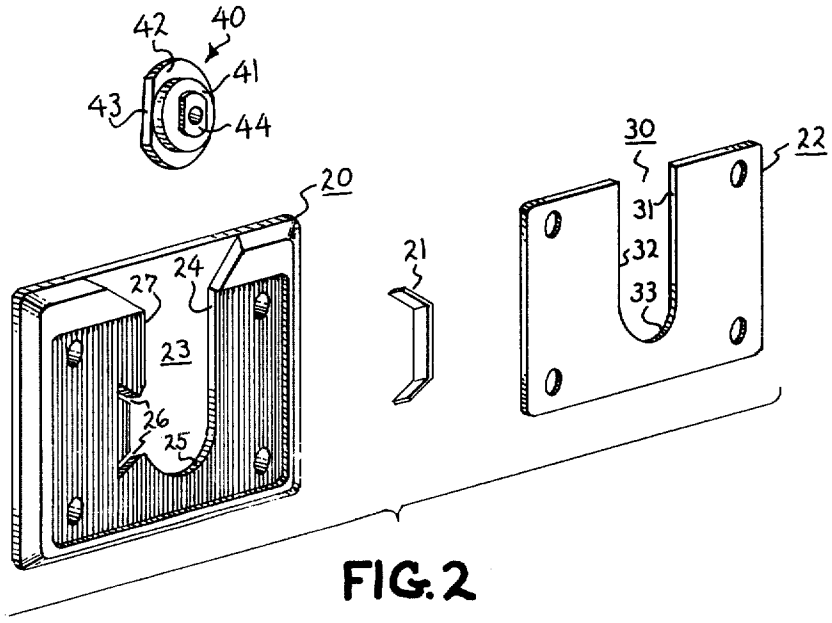


FIG. 2

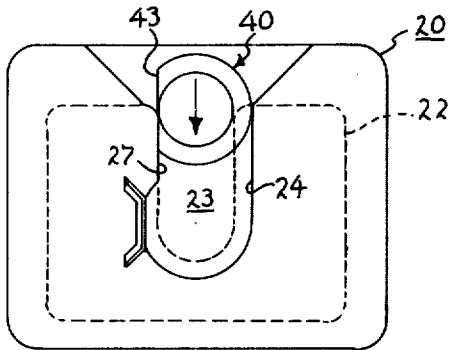


FIG. 3

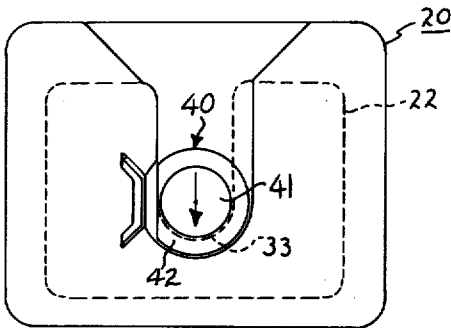


FIG. 4

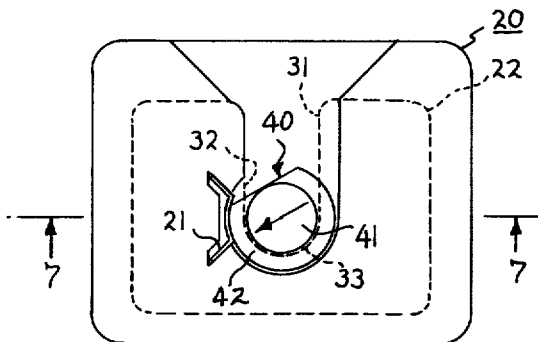


FIG. 5

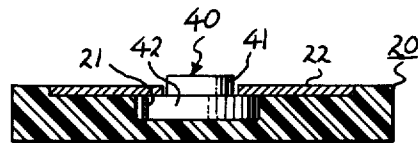


FIG. 7

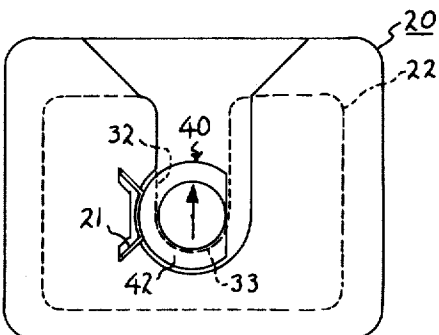


FIG. 6

SEPARABLE FASTENING DEVICE

BACKGROUND OF THE INVENTION

My invention relates to a fastening device, and particularly to a fastening device that permits a radio receiver or the like to be removably and pivotally fastened to apparel or the like.

A desirable feature of any portable device which is to be worn on or carried by a person is that the device can be easily put on or taken off by the person. Another desirable feature is that the device can be pivoted or rotated while on the person so that the device does not get in the person's way when the person is sitting, walking, reaching into pockets, or performing other functions. Portable radios are one such device that should have all of these desirable features. Typically, such radios are rectangularly shaped, and are five inches long or longer, two inches wide or wider, and one inch or more thick. It is desirable that the radio be easily fastened to and removed from the person's apparel, and that the radio be pivotal through a fairly wide arc in order to be kept out of the person's way when that person is performing some function.

Accordingly, an object of my invention is to provide a new and improved fastening device for pivotally carrying a radio or the like on a person's apparel or the like.

A fairly specific object of my invention is to provide a new and improved fastening device which has a structure that permits a portable radio to be easily and removably fastened to an object or wearing apparel.

SUMMARY OF THE INVENTION

Briefly, these and other objects are achieved in accordance with my invention by a device comprising a base plate having a shaped cavity and a holder plate which are attached to one object, preferably the apparel of a person. The cavity and holder plate are adapted to receive a stud with an overhanging flange attached to the other object, such as a portable radio, when the objects are in a relative orientation. After the stud and flange are inserted, the radio is rotated to become pivotally fastened over a fairly wide arc of rotation.

BRIEF DESCRIPTION OF THE DRAWING

The subject matter which I regard as my invention is particularly pointed out and distinctly claimed in the claims. The structure and operation of my invention, together with further objects and advantages, may be better understood from the following description given in connection with the accompanying drawing, in which:

FIG. 1 shows a perspective view of a fastening device in accordance with my invention and as used on the apparel of a person and on a portable radio to be carried by the person;

FIG. 2 shows an exploded, perspective view of the parts making up a fastening device in accordance with my invention; and

FIGS. 3, 4, 5, 6, and 7 show views illustrating the operation of a fastening device in accordance with my invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, I show a preferred application for and a preferred embodiment of a fastening device in accordance with my invention. In this preferred application, my fastening device is used to removably and pivotally fasten a portable radio to the apparel of a person. However, it is to be understood that my fastening device can be used in other applications. Because it is relatively convenient to attach a device such as a radio to the belt of the user, I prefer to attach a receptacle portion 10 of my fastening device to a belt loop 11, formed of suitable material such as leather. Similarly, I prefer to attach a fastening portion 12 to the object, such as a portable radio 13. FIG. 2 shows more detailed views of the receptacle portion 10 and the fastening portion 12. The receptacle portion 10 comprises a base plate 20, an engaging spring 21, and a holder plate 22. The base plate 20 is preferably molded as a single piece of plastic or metal, and has a cavity 23 that starts near the upper edge of the base plate 20 and extends toward the lower edge of the base plate 20. The cavity 23 does not go entirely through the thickness of the base plate 20, but has a flat bottom surface as shown. At the top edge, the cavity 23 may begin with flared walls as shown. The significant part of the cavity 23 begins at a first point near the top, from which a first straight line wall 24 extends to a second point. At this second point, the cavity extends along an arcuate or circular wall 25 for preferably at least 225° to a third point. Part of this circular wall 25 may be broken away or provided with notches 26 to receive the engaging spring 21. At the third point, the cavity 23 extends along a straight line wall 27 to a fourth point opposite the first point. The wall 27 is substantially parallel to the wall 24. The diameter of the circular wall 25 is greater than the distance between the parallel walls 24, 27, with the second point (at the lower end of the wall 24) being tangent to the circular wall 25. The holder plate 22 is formed of a thin piece of metal having an opening 30 that starts at one side and that is bounded by substantially parallel straight lines or edges 31, 32 and by a concave, semicircular, arcuate edge 33. The distance between the straight edges 31, 32 and the diameter of the circular or arcuate edge 33 are equal but somewhat less than the distance between the walls 24, 27 forming the cavity 23. When the receptacle portion 10 is assembled, the spring 21 is inserted in the notches 26 and the holder plate 22 fastened to the upper surface of the base plate 20 by suitable screws or rivets passing through the holes shown in FIG. 2. When the receptacle portion 10 is assembled, the edge 32 of the holder plate 22 is substantially coincident with the wall 27 of the base plate 20. The edge 31 is parallel to the wall 24, and the arcuate edge 33 is generally parallel (or coaxial) with the circular wall 25. However, the edge 31 of the holder plate 22 extends beyond the cavity wall 24, and the edge 33 of the holder plate 22 extends beyond the cavity wall 25 to provide an overhang which provides retention or fastening as will be explained.

The fastening portion 12 of FIG. 1 preferably has a suitable scuff or back plate 36 for attachment to the object or radio 13. The primary part of the portion 12 is a metallic stud 40 having a cylindrical portion 41 and a partially circular overhanging flange 42. The over-

hanging flange 42 has an edge 43 which forms a straight line chord which is preferably tangent to the cylindrical portion 41. An attaching head or element 44 is also provided for attaching the stud 40 to the plate 36 which is fastened to the object or radio 13. The stud 40 is dimensioned so that when it is in the position shown in FIG. 2, it can be inserted into the receptacle portion 10 with the edge 43 bearing against the cavity wall 27, and with the cylindrical portion 41 passing between the edges 31, 32 of the holder plate 22. However, this insertion requires that the stud 40, and the object 13 to which it is attached, be oriented in this relatively precise position.

As indicated in FIG. 1, when the object 13 is to be removably fastened to the apparel of the user, the object 13 must first be rotated as indicated by the arrow 50 in a 180° direction so that the stud 40 can be inserted in the receptacle portion 10. The stud 40 is then pushed downward until it bottoms against the arcuate edge 33, after which the radio or object 13 is rotated as indicated by the arrow 51. Reference to FIGS. 3, 4, 5, 6, and 7 will clarify this fastening operation. In FIGS. 3, 4, 5, and 6, the holder plate 22 is in dashed outline form so that the stud 40 can be seen in entirety to show how it is retained. In FIG. 3, the radio or object 13 has been positioned so that the stud 40 has just passed the flared walls of the cavity 23 and has begun to pass between the straight walls 24, 27 of the cavity 23. FIG. 3 also shows that in order to insert the stud 40, the relative shape and dimensions of the stud 40, the cavity 23, and the holder plate 22 are such that the flange edge 43 must be adjacent and parallel to the wall 27. In this regard, an arrow is drawn on the stud 40 and points toward the top of the radio or object 13. Subsequently, the radio 13 is pushed downward with the same orientation, until the cylindrical portion 41 of the stud 40 engages the arcuate edge 33 of the holder plate 22 as shown in FIG. 4. In this condition, the radio 13 is fastened, and may only be removed by withdrawing directly upward and opposite the direction of the arrow shown in FIG. 4. FIG. 5 shows the radio after it has been rotated approximately 45°. With this orientation, the flange 42 of the stud 40 is retained by the overhanging portion of the holder plate 22. This overhanging portion is provided because the circular wall 25 of the cavity 23 is back or recessed beneath the arcuate edge 33 and part of the straight line edge 32 of the holder plate 22. This retention is also shown by the cross-sectional view of FIG. 7 which is taken along the lines 7-7 in FIG. 5. In this condition, the flange 42 of the stud 40 is retained over approximately 180° of arc around the arcuate edge 33 of the cover plate 22. Also in FIG. 5, it will be noticed that the flange 42 has begun to depress the spring 21. And finally, in FIG. 6, the radio or object 13 has been rotated 180° to its normal vertical or upright position. In this condition, the flange 42 of the stud 40 is retained over approximately 180° of arc, and is securely and pivotally fastened to the receptacle portion 10. The freedom with which the object or radio 13 can pivot is determined by the tension and dimensions of the engaging spring 21.

It will thus be seen that I have provided a new and improved device for removably fastening a radio receiver or the like to a user's apparel or the like. My fastening device is relatively simple, but provides positive fastening with pivotal freedom. While my device is quite simple, a feature which enhances its use and manufacture,

it is highly effective. While I have shown only one embodiment, persons skilled in the art will appreciate that modifications may be made. For example, the engaging spring 21 and its notches 26 may be omitted. The device can be fashioned of almost any suitable material having various dimensions for the operating surfaces, depending upon individual preference. The flared openings of the cavity 23 may be omitted. Further, the arcuate length of the circular wall 25 may be varied, although a minimum of 225° is preferred. Therefore, while I have described my invention with reference to a particular embodiment, it is to be understood that modifications may be made without departing from the spirit of my invention or from the scope of the claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A device for removably and pivotally fastening first and second objects together, comprising:

- a. a base plate having a surface having a cavity therein, said cavity being bounded by a wall extending from a first point in the vicinity of one edge of said base plate in a first straight line to a second point, extending from said second point along a generally circular arc for approximately 225° to a third point, and extending from said third point along a second straight line that is parallel to said first straight line to a fourth point in the vicinity of said one edge;
- b. a holder plate having an opening therethrough that is bounded by substantially parallel third and fourth straight lines extending from an edge of said holder plate to interior points and by a concave semicircular arc between said interior points, the distance between said third and fourth parallel straight lines and the diameter of said semicircular arc being substantially equal but being less than the distance between said first and second parallel straight lines;
- c. means fastening said holder plate on said surface of said base plate in a position so that said fourth straight line substantially coincides with said second straight line, so that said semi-circular arc overhangs said cavity and is concentric with said generally circular arc, and so that said third straight line overhangs said cavity and is substantially parallel to said first straight line;
- d. a cylindrical stud adapted to be fastened at one end to said second object, said stud having a diameter slightly less than said distance between said third and fourth straight lines to permit said stud to pass therebetween;
- e. and a substantially flat, generally circular flange concentrically fastened to the other end of said stud, said flange having a thickness less than the depth of said cavity and having an edge formed by a straight line chord tangent to said cylindrical stud and by a circular arc between the ends of said chord, said circular arc having a diameter slightly less than the diameter of said circular arc of said cavity so that the circular part of said flange overhangs said stud.

2. The device of claim 1 wherein said cavity wall flares outward from said first and fourth points in diverging directions to said one edge of said base plate to facilitate insertion of said stud flange.

3. The device of claim 1 wherein said cavity wall diverges from a portion of said generally circular arc to

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provide notches, and wherein said device further comprises a resilient spring positioned in said notches to frictionally engage said stud flange.

4. The device of claim 1 wherein said cavity wall flares outward from said first and fourth points in diverging directions to said one edge of said base plate to

facilitate insertion of said stud flange, wherein said cavity wall diverges from a portion of said generally circular arc to provide notches, and wherein said device further comprises a resilient spring positioned in said notches to frictionally engage said stud flange.

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