Aug. 23, 1960 A. KAFKO ET AL 2,949,612

COLLAPSIBLE RETAINING AND SIGNALING MEANS FOR SLIDE FASTENERS

Filed May 18, 1959

2 Sheets-Sheet 1

FIG.1.

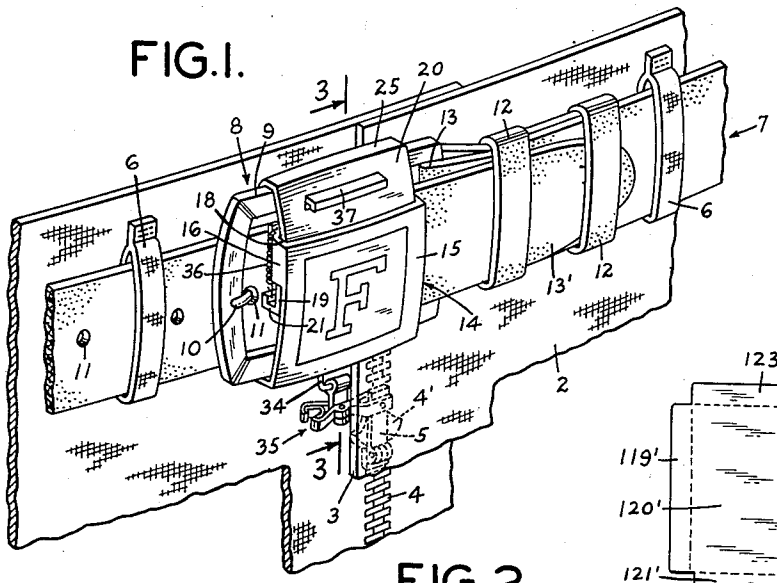


FIG.2.

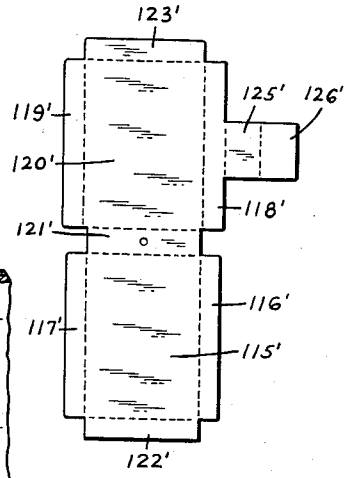
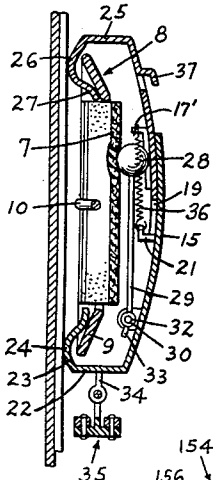


FIG.7.

FIG.3.



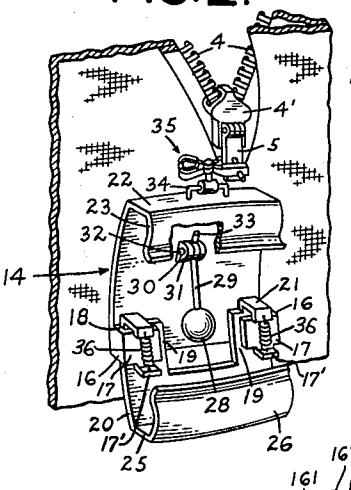
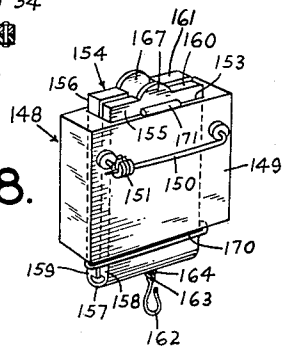


FIG.8.



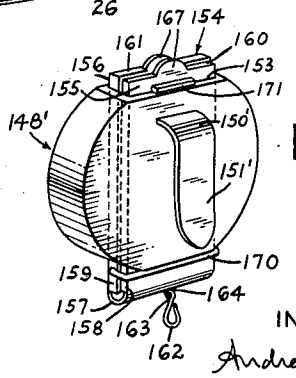


FIG.9.

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Aug. 23, 1960 A. KAFKO ET AL 2,949,612

COLLAPSIBLE RETAINING AND SIGNALING MEANS FOR SLIDE FASTENERS

Filed May 18, 1959

2 Sheets-Sheet 2

FIG. 4.

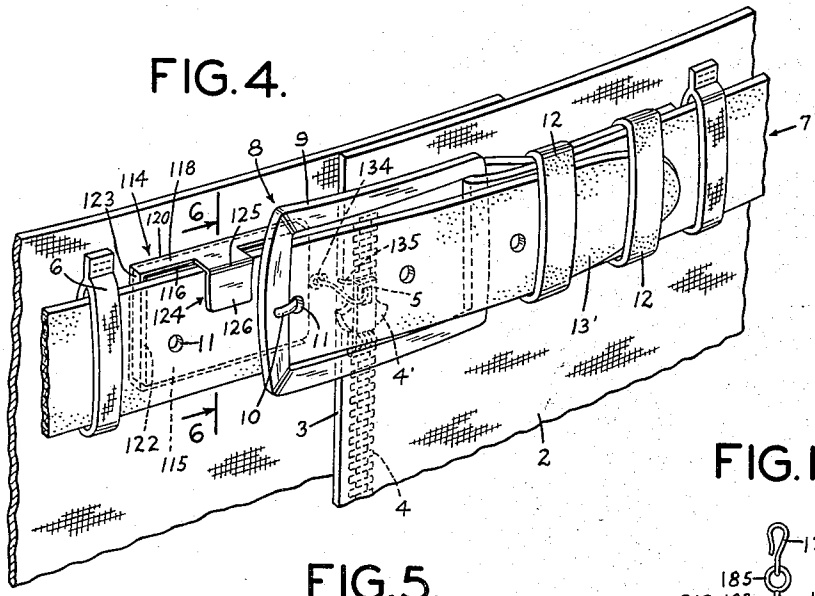


FIG. 5.

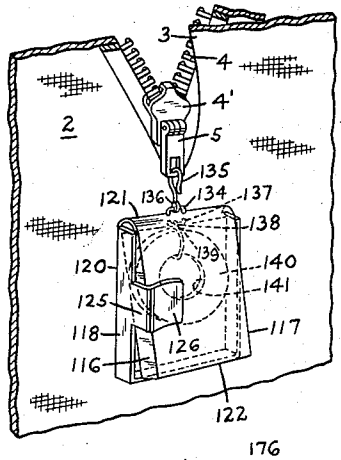


FIG. 6.

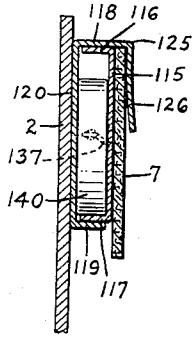


FIG. 10.

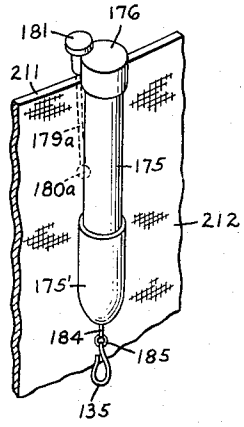
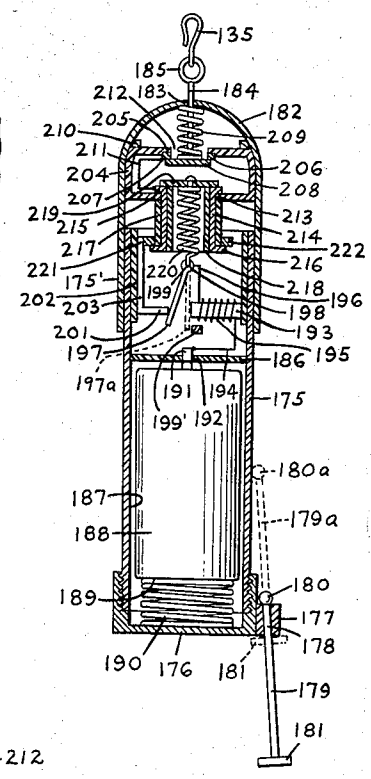


FIG. 11.



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COLLAPSIBLE RETAINING AND SIGNALING MEANS FOR SLIDE FASTENERS

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Filed May 18, 1959, Ser. No. 814,015

19 Claims. (Cl. 2—234)

The present invention relates generally to retaining and signaling devices for slide fasteners and more particularly to a device that functions in a dual manner to retain the slide fasteners of garments in position after they have been pulled to closed position and to signal the condition of such slide fasteners if inadvertently left unclosed.

The use of slide fasteners has become conventional for most purposes where buttons formerly performed the required closing function; e.g., in women's clothes such as dresses, skirts, girdles and the like, sweaters, luggage, boots and the like, etc. Particularly, because of the ease and efficiency of their operation, slide fasteners have lent themselves admirably to practically universal acceptance as the closure means for women's dresses and bathing suits, and for the fly fronts of men's trousers. In this connection, infallibility of actual operation has been developed to a marked degree during the decades of use of slide fasteners generally. Devices have also been proposed to retain slide fasteners for men's trousers and the like; e.g., in U.S. Patents 2,111,924 and 2,656,579. Also, locking means have been built into the slide fastener manipulators per se that are operable by the pull tab and are considered more or less conventional. Such devices function as retaining or locking means only after the wearer has remembered to pull the slide fastener to or toward closed position.

However, insofar as we are aware, no feasible solution of the problem of assuring that such or other garment slide fasteners that are not equipped with retaining or locking means are moved to closed position has ever been proffered. The important of an adequate solution of the foregoing problem appears self-evident. Thus, since the adoption of the use of garment slide fasteners. both men and women wearers of garments equipped with such closure devices have been in the shadow of the very real possibility that their particular garment slide fastener will inadvertently either be left in entirely unclosed position or in partially unclosed position. Apprehension of such an embarrassing situation is enhanced when the wearer is perforce exposed to even more general public view when teaching, lecturing, entertaining or otherwise appearing on a stage or podium and, particularly in the last decade, when appearing on television in the view of spectators that, at times, may literally number in the millions. The prior art devices, while offering solutions to related problems, have not, so far as we are aware, ever offered a solution of the problem here discussed.

In our copending application Serial No. 651,961, now U.S. Patent No. 2,886,825, we have described novel combined retaining and signaling devices for use with slide-fastener equipped garments and the coactive functioning thereof, whereby the devices operate to retain the slide-fastener in closed position after the latter has been pulled to such position, and give a signal to the wearer when the slide-fastener is in unclosed position. Generally speaking, these devices comprise a housing,

means attached to the housing for connecting the latter to the tab of a slide-fastener, other means for detachably mounting or connecting the housing, respectively on or to, the garment with which the slide-fastener is operatively associated, and audible signaling means carried by the housing. An important feature of these devices is that the audible signaling means is so constructed and arranged that it is rendered inoperative when the housing of the device is attached to the tab of the slide-fastener and mounted on or attached to the garment, and is rendered operative when the housing is detached or disconnected from the garment and is suspended from the tab of the slide-fastener.

The devices disclosed in our aforesaid copending application function admirably to perform their intended dual purpose of retaining a slide-fastener in closed position and signaling the wearer of the unclosed condition of the slide-fastener when such is the case. Moreover, by the general nature of the devices disclosed in said copending application, they may function additionally as decorative members when performing their slide-fastener retaining function, as also described in said copending application. In such cases, since it is specifically desired that the devices be readily observed, the mounting thereof for attachment to the garment is arranged so that the former purpose may be achieved. Moreover, the sizes of the devices may be increased to the same purpose and, concomitantly, to provide larger and hence more effective sounding areas.

However, it will be apparent that in certain circumstances, or when only a matter of taste may be involved, it may be desirable to provide a mounting for the devices that permits substantial concealment thereof when carried in the slide-fastener retaining position. Further to this end, it may also be desirable to permit diminution of the size of the devices when so carried, but without sacrifice of the audible signaling qualities normally inherent in larger and heavier devices.

With the foregoing problems and the disadvantages and deficiencies of the prior art practices and devices in this field in mind, it is a primary object of the present invention to provide devices that will effectively retain the slide-fastener of garments in closed position and will also signal the wearer of the unclosed condition of the slide-fastener when such is the case.

It is another object of this invention to provide devices of the type described above that comprise audible signaling means that are rendered operative when the slide fastener with which it is used is in an unclosed condition and rendered inoperable when the devices are supported on a belt buckle associated with a pair of trousers and in retaining relationship with the slide-fastener after it has been pulled to closed position.

Another object of the invention is to provide devices of the type described above that are dimensioned to nest behind a belt associated with a pair of trousers when such devices are in slide-fastener retaining position without undue sacrifice of audible sound-producing qualities when suspended from the pull tab of the open slide-fastener of said trousers.

Still another object is to provide devices of the type described that have a minimum collapsed thickness when nested on their mounting, such as the belt of a pair of trousers, to thereby restrict movement of sounding means housed in the devices; and which expand to permit adequate freedom of movement of said sounding means and the formation of an enlarged sound chamber, when the devices are freely suspended from the pull tab in open slide-fastener warning position.

Yet another object is to provide devices as described immediately above that are constructed to permit the entire housings thereof to be economically struck from

metal sheet material as unitary blanks that may then be bent into appropriate shape.

It is yet another object of this invention to provide dual retaining and signaling devices of the nature described that are easily detachable from their mounting means and easily attachable thereto with a minimum amount of lifting thereof necessary, above the final mounted position on said mounting means.

Yet another object of the invention is to provide devices that perform the functions of the devices described but need not necessarily be mounted either on the buckle of a belt or the belt itself.

Another object of the invention is to provide a device of the nature described that positively assures a continued audible signal automatically when the slide fastener with which it is associated is in open condition.

Still another object of the invention is to provide the devices of the invention with a decorative function in addition to the utilitarian functions inherent therein.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the various precise embodiments of the invention herein described may be made within the scope of what is claimed without departing from the spirit of the invention. It will be further understood that our invention is susceptible of embodiment in many and various forms, some of which are illustrated in the accompanying drawings, and that the structural details and modes of assembly herein set forth may be varied and interchanged to suit particular purposes and still remain within our inventive concept.

The invention will be more clearly understood from a consideration of the following description taken in connection with the accompanying drawings that form a part of this specification. In such drawings, wherein like numerals identify like parts in the several embodiments and views thereof;

Figure 1 is a perspective view of an embodiment of the dual retaining and signaling means of the invention shown removably mounted on the buckle of a trousers belt of conventional design and attached to the pull tab of a standard slide fastener for the fly of the pair of trousers with which the belt is operatively associated;

Figure 2 is a perspective view of the device of Figure 1 shown detached from the buckle of the belt and suspended from the pull tab of the fly slide fastener now in unclosed condition, said device being in operative position for indicating such unclosed condition of the slide fastener;

Figure 3 is a vertical cross-section of the device shown in Figure 1 along section line 3—3 thereof to show the relationship of the attachment means and bell clapper of the device with the frame of the belt buckle and the belt web, respectively;

Figure 4 is a perspective view of a preferred embodiment of the dual retaining and signaling means of the present invention shown removably mounted in collapsed position behind a belt associated with a pair of trousers, and attached to the pull tab of the closed fly slide-fastener of the trousers, whereby said slide-fastener is retained in closed position;

Figure 5 is a perspective view of the device of Figure 4 shown detached from behind the belt and suspended from the pull tab of the fly slide-fastener now in unclosed condition, said device being in expanded, operative sound-producing condition for indicating the unclosed condition of the slide-fastener to the wearer of the trousers;

Figure 6 is a cross-section of the device shown in Figure 4, along line 6—6, to disclose more clearly the nested condition of the two cooperating sections of the device housing, and the movement-restriction function thereof in such position upon the otherwise movable sounding element housed therein;

Figure 7 is a plan view of a blank from which the device, illustrated in Figures 4 to 6, may be fashioned by a simple bending operation;

Figure 8 is a perspective view of the rear of another embodiment of the dual retaining and signaling means that is similar to the retaining devices per se of Figures 4–7, but which may be employed by direct pinning attachment of a mounting means therefor to a garment such as a woman's dress, skirt, blouse or the like, rather than by being mounted on a belt or buckle thereof;

Figure 9 is a rear perspective view of a modification of the device and mounting of Figure 8 wherein the garment-attaching means is a clip-on type rather than the pin of Figure 8.

Figure 10 is a perspective view of still another embodiment of the invention that is positive in audible signaling action when suspended in operative position and that also may be supported in easily removable relationship on the web per se of a belt or the waist band of a pair of trousers, a waist band being shown for purposes of illustration, and the web connecting means being also shown in dotted line position to indicate the mode of attachment and detachment; and

Figure 11 is an enlarged vertical cross-sectional view of the device of Figure 10, along section 11—11 thereof to show the internal structure and here shown inverted to illustrate the relationship of parts when the device is rendered operative.

Referring now to Figure 1, there is shown the top front portion of a pair of conventional men's trousers **2** having the usual fly front **3** equipped with a slide fastener **4** and operator **4'** therefor having the customary apertured pull tab **5**. The trousers **2** are also provided with a plurality of usual belt loops **6**. Drawn through the belt loops **6**, is a belt **7** of leather or other material having a buckle **8** of conventional design comprising the usual substantially rectangularly shaped metal frame **9** and fastening prong **10** attached to one end **13** of belt **7** and receiving the other end **13'** of belt **7** in retaining straps **12** mounted on belt **7** in the usual manner. Belt **7** is provided with the usual holes **11** through which prong **10** selectively extends in known manner to be held in locking engagement with frame **9**.

Still referring to Figure 1, there is mounted on the buckle **8**, a dual holding and signaling means **14** as one embodiment of the present invention. In accordance with the embodiment illustrated in this figure, the dual holding and signaling means **14** comprises a main body portion or housing **15** of general convex configuration and preferably formed of a unitary sheet of metal that is stamped and bent to provide various structural elements now to be described.

As best seen in Figure 2, the main body **15** is bent at one end thereof at almost right angles thereto to provide a flange **22**, which in turn carries a second flange **23** bent at substantially right angles to the flange **22** to thereby provide a substantially U-shaped channel. The second flange portion **23** has the end thereof bent into a substantially S-shaped curve, as best seen in Figure 3, to so provide a resilient clamp **24** for a purpose that will appear hereinafter. Both sides of the main body **15** have a lug **16** attached thereto and bent substantially at right angles therefrom. The two lugs **16** also have second lugs **17** bent therefrom that, as best seen in Figure 2, extend substantially parallel to the plane of main body **15** to form therewith a pair of opposed substantially U-shaped channels **18** for a purpose that will likewise appear hereinafter. Each lug **17**, in turn, carries a lug **17'** extending at right angles thereto for a purpose that will become apparent hereinafter.

Continuing with the description of the structure of main body **15**, as best seen in Figure 2, there is mounted on the inner surface thereof a pair of brackets **31** that mount by means of bearing apertures **32** therein a spindle **30** on which is fixedly attached a rod **29**. The rod **29** has

supported at the longer end, a bell clapper 28 and at the shorter end there is provided a stop lug 33 which limits outward swinging of rod 29 and bell clapper 28 mounted thereon with respect to main body 15. A second body 20 is slidably mounted within the U-shaped channels 18 of main body 15 by means of legs 19. Preferably, a small amount of lateral play is provided for legs 19 in channels 18 for a reason to appear later. The legs 19 have bent therefrom, at their extreme ends, outturned flanges 21 that function as stop means for the outward sliding movement of body 20 in the main plane of body 15 for the dual purpose that will appear hereinafter. Body 20 has a flange 25 similar to the flange 22 of main body 15 and a second flange 26 thereon extending substantially perpendicularly to the flange 25 and having a substantially S-curved cross-section 27 similar to S-curve 24 of body 15. As in the case of body 15, there is thus formed by body 20 a similar clamp defining a U-shaped channel. Preferably, there is provided on body 20 a tab 37 struck therefrom that facilitates grasping of body 20 for urging sliding movement thereof in the channels 18 provided by body 15 and lugs 16, 17 thereon. Tab 37 also functions to limit inward sliding movement of body 20 relative to main body 15 by ultimate abutment with the proximate end of body 15, while lugs 21 on body 20 limit outward sliding movement thereof with respect to body 15 as already described above.

In accordance with the present invention and as shown in Figure 2, there are also provided two springs 36, one of which is connected at one end thereof to one of lugs 17' and at the other end thereof to the lug 21 operatively associated therewith as indicated hereinbefore, and the other of which is similarly connected to the other lug 17' and to the lug 21 operatively associated therewith.

Flange 22 on main body 15 has fixedly attached thereto a loop 34 on which is carried a connector 35 for detachably connecting the entire retaining and signaling device with the apertured pull tab 5 of an operator 4' for a slide fastener 4.

In the use or operation of the entire retaining and signaling device, the connector 35 is fastened to the apertured tab 5 of the operator 4' of slide fastener 4 for the fly front of a pair of trousers 2. After the conventional belt 7 used therewith has been fastened by selecting a desired hole 11 into which prong 10 of buckle 8 has been inserted and end 13' has been drawn through belt loops 12, the slide fastener operator 4' may be drawn to closed position with the use of the device 14 as manipulator, if desired. Then, with reference to Figures 1 and 3, the U-shaped channel provided by flanges 22 and 23 on main body 15 is forced on to the substantially horizontal bottom rail of buckle frame 9 so that spring element 24 snaps behind the aforesaid rail that, as shown, may be inclined from the vertical but still be accommodated. The device 14 is then pivoted in a counterclockwise direction as viewed in Figure 3 with body 20 extended outwardly, as aided by springs 36, sufficiently in channels 18 provided on body 15 so that flange 26 and clamp 27 thereof clear the upper rail of frame 9 of buckle 8. Subsequently, body 20 is pushed downwardly in channels 18 of body 15 until the U-shaped channel provided by flanges 25 and 26 on body 20 nests over the upper rail of buckle 8 with resilient S-curved clamp 27 therebehind, whereby device 14 is effectively fastened to the belt buckle 8 at top and bottom. As will be understood, springs 36 will be chosen to have an extensor biasing strength insufficient of itself to cause disengagement of S-curved clamp 27 from the top rail of belt buckle 8. In this position of device 14, minor deviations in the parallel relationship between upper and lower rails of buckle frame 9 are accommodated by the lateral play of legs 19 in channels 18 referred to hereinbefore. This, in effect, permits limited relative swiveling between bodies 15 and 20 in the common main plane thereof against the counter balancing action of springs 36 in said plane.

As will be clear upon examination of Figure 3, the outward relationship of bell clapper 28 being limited by stop lug 33, as previously described; engagement of bell clapper 28 with the front surface of the material of belt 7 during the counterclockwise movement of body 15 and downward movement against the upwardly biasing action of springs 36 of body 20 is assured to cause wedging of clapper 28 between such belt surface and the inner surface of main body 15 that is presented between the outwardly extending legs 19 of body 20. In such position, while bell clapper 28 is effectively held against any signaling engagement with the aforesaid inner surface of main body 15, slide fastener operator 4' is effectively retained to prevent any accidental opening of the slide fastener 4.

When the wearer desires to open slide fastener 4 for any reason, he merely grasps body 20 with the aid of lip 37 and lifts body 20 in channels 18 until resilient clamp 27 on flange 26 snaps out of engagement with the rear surface of upper rail 9 of buckle 8. Springs 36 immediately cause extension of body 20 outwardly of body 15 to provide an enlarged housing or chamber for the sounding means comprising pivotal rod 29 and bell clapper 28 thereon. Subsequently, the device may be pivoted in a clockwise direction, as viewed in Figure 3, on lower rail 9 of buckle 8. After tab 5 with device 14 connected thereto has been pulled to open fastener 4 as desired, the wearer allows the device 14 to remain suspended in the position shown in Figure 2. In such position, as will be obvious, any movement of the wearer will cause bell clapper 28 mounted on stem 29 to swing on spindle 30 into striking engagement with the inner surface of main body 15, whereby an audible sound results. Moreover, the fact that body 20 has been pulled to an outer position on housing 15 at the time of release from the belt buckle, and such relationship is maintained when the device is in suspended position; there is provided an enlarged sound chamber whereby the sound is amplified. Thus, in the event the wearer neglects to pull tab 5 of slide fastener operator 4' back to closed position and thus does not allow reaffixing of the device 14 to the belt buckle 8 as previously described, device 14 will remain in the suspended position shown in Figure 2 anywhere along the slide fastener track 4 it has been left. As will be understood, no matter what such position, the mere fact that the device is in freely suspended position and maximum expanded condition will result in clearly audible signaling upon movement of the wearer so as to apprise him of the open condition of the slide fastener 4 whereby he may take proper steps to correct the condition and fasten the device 14 to the belt buckle 8 to retain the slide fastener 4 in closed position until desired otherwise.

Referring now to Figs. 4–7 of the drawings there is shown a preferred embodiment that may be utilized by mounting the device on the webbing of belt 7 rather than the buckle 9 thereof when the device is in slide-fastener retaining position, as is done in the case of the modification illustrated in Figs. 1–3, for example. In the embodiment illustrated in Figs. 4–7, the device 114 comprises a unitary housing that has two main wall portions 115, 120 which, as best seen in Fig. 5, are connected by a section 121. Section 121 functions as a resilient hinge for wall portions 115, 120 that biases the latter two to the separated relationship best seen in Fig. 5.

Wall portion 115 has inturned flanges 116, 117 at the longer sides thereof, respectively, and an inturned flange 122 at the end thereof that is remote from the end connected to section 121. Wall portion 120 has similarly inturned side flanges 118, 119 and an inturned end flange 123. However, wall portion 115 is of slightly lesser dimensions than is wall portion 120 to permit telescoping relationship of flanges 116, 117 and 122 within flanges 118, 119 and 123 when device 114 is in collapsed position, such as when positioned behind belt 7 as in Fig. 4, and as best seen in Fig. 6.

To permit retainment of device **114** in collapsed position behind belt in Fig. 4, there is provided a tang **124** that comprises an inwardly turned flange **125** on wall portion **120** that extends appreciably further than flange **118** and has at its end a second flange **126** that is further inturned to extend in a plane substantially parallel to that of wall portion **120**. Retainment flange **126** and the remainder of device **114** function as clamping means on the web of belt **7**, as will appear more fully hereinafter.

Retainment flange **126** has a second function of acting as a stop means for limiting the amount of separation between the wall portions **115** and **120** when device **114** is in expand condition, as best seen in Fig. 5.

The structure described above may be struck from a unitary stamping such as that shown in Fig. 7, by means of simple bending operations along the dotted lines to form the elements indicated by primed numerals, corresponding to the similarly numbered elements in Figs. 4–6, as will be readily understood by those skilled in the art.

As best seen in Fig. 5 there is connected to the outer surface of section **121**, a loop **134** to which is attached a connector **136**, which connector, in turn, has attached to its other end, fastening means **135** that are detachably connected to the tab **5** of the closure member **4'** of a conventional slide fastener **4** for a pair of trousers **2**.

Referring to Fig. 6, attached to the inner surface of section **121** and substantially opposite loop **134** is a second loop **137**. Retained in loop **137** is another loop **138** formed at one end of pendulum rod **139**. Pendulum rod **139** carries at its other free end a bell clapper **140** that is in freely pivotal relationship thereto by means of the loose connection therebetween afforded by large opening **141** in bell clapper **140**.

In the use of the device just described, the housing or device **114** attached to connector **136** by loop **134** is connected to tab **5** of slide fastener assembly **4**, **4'** by fastening means **135**. To retain the slide fastener **4'** in closed position, tab **5** is first pulled upwardly in the usual manner, but with device attached thereto as described. After fastener **4'** is pulled to fully closed position, device **114** is pressed to collapsed or telescoped position and positioned under belt **7** with flanges **125** and **126** facing forwardly and then slipped upwardly behind webbing of belt **7** until flanges **125** and **126** clear the upper edge of belt **7**. Then flanges **125** and **126** are forced downwardly over the upper edge of belt **7** so that flange **125** overlies the upper edge of the web of belt **7** with flange **126** extending downwardly to clamp belt **7** between the front surface of wall portion **115** and the inner surface of flange **126**, as best illustrated in Fig. 6, while device **114** in turn, is wedged between the inner surface of belt **7** and the outer surface of trousers **2**. The biasing effect of section **121** to spread wall portions **115** and **120** apart functions to enhance the clamping and wedging actions just described.

In such manner, device **114** is effectively held in position to thereby retain tab **5** of slide fastener **4'** pulled to closed position. At the same time the clamping and wedging actions described above cooperate to cause compression of wall portions **115** and **120** of device **114** toward each other. This compressive action of wall portions **115** and **120** effectively functions to retain bell clapper **140** therebetween to prevent sound-producing movement of clapper **140** against said wall portions **115** and **120** of device **114**.

When it is desired to open slide fastener assembly **4**, **4'**, user simply grasps device **114** between the thumb and forefinger, for example; lifts device **114** sufficiently to disengage flange **126** from the front of belt **7** and then pushes the device **114** rearwardly and downwardly behind belt **7** until the latter is cleared. Thereafter, the tab **5** of slide-fastener **4**, **4'** with device **114** attached thereto as described, is drawn downwardly to opened position. Thereafter, device **114** is permitted to dangle freely on the assembly of chain **136**, loop **134** and fastening means **135**, whereby any movement of the user causes swinging of device **114** and pendulum rod **139**, and bell clapper **140** attached thereto within the housing of device **114**, defined by separated wall portions **115** and **120** which, when struck by bell clapper **140**, emit warning sounds that are amplified by the chamber defined by wall portions **115** and **120** separated by means of resilient section **121** to the limit defined by flange **126**.

Fig. 8 illustrates a form of the invention that is applicable without the necessity for either a belt or buckle of any kind. Accordingly, this form is particularly useful for garments, other than men's trousers, that are equipped with slide fasteners. Instead of a belt buckle or belt as supporting means for the removable housing that carries the audible signaling means and tab connecting means, as in the embodiments illustrated in Figs. 1–7, for example; there is provided instead a casing **148** that has affixed to the rear **149** thereof, conventional pin and locking elements **150** and **151**, respectively. By the two last-named means, casing **148** may be fastened to a garment in a region closely adjacent the location of the tab of the garment slide fastener when such tab has been pulled to the position for closing the fastener. Casing **148** defines a vertical disposed open-ended sleeve **153** of substantially rectangular cross-section.

Operatively associated with casing **148**, and shown in Fig. 8 within sleeve **153** thereof in phantom for purposes of illustration, is housing **154** that may be quite similar to housing **114** of Figs. 4–7, with the exceptions now noted hereinafter. Thus, housing **154** similarly comprises: two wall portions **155** and **156** connected at one end by resilient section **157** that functions to bias said wall portions outwardly from each other as shown; side flanges **158** and **159** and end flanges **160** and **161** on said wall portions that are nestable due to the slightly differing dimensions of wall portions **155** and **156**; and loop **164** on the outer surface of section **157** for connecting housing **154** to the tab **5** of a slide fastener **4**, **4'** by means of a connector **162** provided with a loop **163** that is retained in loop **164** that is associated with an inner loop (not visible in Fig. 8) similar to loop **137** of the device shown in Fig. 5 to which a pendulum is attached, with the latter carrying a bell clapper, neither of which structure is visible in Figure 8, but may be similar to pendulum rod **139** and bell clapper **140**, respectively, illustrated in phantom in Figure 5. However, for purposes that will appear hereinafter, end flanges **160** and **161** of the embodiment of the invention illustrated in Figs. 4–7, each have in the present embodiment a tab **167** struck therefrom that extends substantially in the plane of the respective wall portion **155** and **156**, wall portion **155** has an embossed ridge **171** immediately below tab **167**, and flange **125** and retaining flange **126** of the embodiment of Figures 4–6 are replaced by a retaining bar **170** that is attached at either end to each of the two side flanges **159**, respectively, of wall portion **156** and embraces wall portion **155**. It will be clear that operation and use of the device of Fig. 8, apart from the mode of attachment to the garment per se as already described above, is similar to that described for the embodiment illustrated in Figs. 4–7. Specifically, in the operation of the embodiment of the invention just described, casing **148** is attached to the garment with which the device is to be used in the region of the slide fastener thereof. Housing **154** is attached to the tab of the slide fastener associated with said garment by means of the assembly comprising loop **164**, chain **163** and connection **162**. To retain the slide fastener in closed position after it has been pulled to such position, wall portions **155** and **156** are squeezed together and the end of housing **154** bearing tabs **167** is inserted into the lower end of sleeve **153** until ridge **171** snaps over the upper edge of casing **148** and bar **170** engages the lower edge of casing **148** so that housing **154** is releasably retained in casing **148** in the relationship illustrated in Fig. 8. To disengage housing **154** from casing **148** tabs **167** are

squeezed together to disengage ridge 171 from the upper edge of casing 148.

Thereafter, housing 154 may be pushed downwardly and then pulled out of the bottom of casing 148. The tab of the slide fastener is then pulled to open position and housing 154 is permitted to dangle on loop 164 in inverted position. Resilient section 157 causes flanged wall portions 155 and 156 to diverge and form an expanded sound chamber precisely as in the case of the embodiment disclosed in Figs. 4–7. However, in the present case the amount of divergence is limited by bar 170. The audible signaling function then occurs upon the movement of the wearer to warn him of the open condition of the slide fastener as in the embodiments of the invention described previously.

The device of Fig. 9 as that of Fig. 8, is suitable for use with slide fastener-equipped garments, without the need of a belt buckle of any kind as supporting means. As will be evidenced by comparison with the Fig. 8 embodiment, that illustrated in Fig. 9 differs therefrom essentially only in the type of fastening-to-garment means 150' for the supporting casing 148'. Fastening means 150' is of the conventional clip type having an inwardly contoured resilient shank 151', preferably of metal. The method of attachment of casing 148' to a garment by slipping clip 150' over an edge thereof in a region adjacent that reached by the tab of a slide fastener when pulled to closed position, will be clear, particularly in the light of the previous descriptions, as will also be clear the use of the device by removal from and attachment to casing 148' and its functioning in detached and tab-suspended position precisely as in the embodiment of Fig. 8.

The casings 148 and 148' of the embodiment of Figs. 8 and 9 lend themselves to decorative treatment, as is of particular importance when the garment may be a lady's dress, skirt, blouse or the like. For example, the casings may then be in the decorative form of a brooch, scatter pin, medallion, or the like, and still embody the present invention.

In Figs. 10 and 11, there is illustrated a form of the invention that is particularly adapted for use with slide fasteners of men's trousers not equipped with a belt, but, as will later be apparent, not necessarily limited to such use. As shown in Fig. 10, the device of this embodiment comprises a pair of cylindrical metal casings 175 and 175' in telescopic relationship. Casing 175 is closed at one end by a metal screw cap 176 that has either integral therewith or welded thereto, or otherwise attached thereto, a tubular bearing 177. Tubular bearing 177, as best seen in Fig. 11 (that is a vertical cross-section of casings 175, 175' of Fig. 10, but inverted to better illustrate the functioning thereof hereinafter) is positioned with its longitudinal axis 178 slightly inclined toward that of cylindrical casing for a purpose that will presently appear. Slidably mounted in bearing 177 is a rod 179 having a contact ball 180 at one end and a manipulating disc 181 at the other. The closed end 182 of casing 175' may be rounded as shown, and, in any case is provided with an aperture 183 through which reciprocates a rod 184 having a loop 185 by which rod 184 may be attached by means of a hook 135 connected in loop 185 and/or by means of a connector, such as 35 of Figs. 1–3, to the tab of the slide fastener (none of which last structures are shown).

As best shown in Fig. 11, the interior formed by telescoping casings 175 and 175' is divided into two main compartments by means of an apertured disc 186 of insulating material in casing 175. In the lower compartment 187 (as viewed in Fig. 11) there is housed a small dry cell 188 of the conventional type used in "fountain pen" lighters and the like. As shown, dry cell 188 is positioned with its metal surface 189 in contact with the metal spring 190 carried by metal cap 176 for the purposes of urging dry cell 188 against a metal contact 191 fixed in the aperture 192 of disc 186, and for acting as conductor between metal surface 189 of cell 188 and metal casings 175 and 175' as is conventional in the flashlight art, for example.

Mounted on the interior surface of casing 175, but insulated therefrom, is a small solenoid core 193. A conducting wire 194 is connected at one end thereof to metal contact 191. Wire 194 then forms the winding 195 for solenoid core 193 and the other end 196 of wire 194 is connected to a resilient metal vibrator 197 at the end 198 thereof by which it is fixedly mounted on a spindle 199 supported on the interior walls of cylindrical casing 175, but also insulated therefrom. Resilient vibrator 197 is adapted to move in the field of solenoid core 193 from the position shown in full lines 197 to the flexed position shown in broken lines 197*a* wherein an insulated stop 199' is abutted upon energization of coil 195, and to snap back to full line position 197 against combined stop and contact 201 when coil 195 is deenergized. Combined stop and contact 201 is insulated by insulating strip 202 along which conducting wire 203 attached to contact 201 extends.

Press-fitted within casing 175' is an insulating switch housing 204 of generally toroidal configuration that has an inturned bead 205 at its upper open end 212 (as viewed in Fig. 11) that functions as retaining means for an annular metal contact disc 206 to which a conducting wire 211 is connected at 207, as shown. The end of rod 184 within casing 175' has affixed thereto a circular metal contact disc 208 adapted to reciprocate axially of insulating cup 204. A spring 209 encircles the portion of rod 184 inside casing 175' and is retained between the inner surface of casing 175' surrounding aperture 183 and the opposed surface of circular contact disc 208 so as to bias disc 208 downwardly, as viewed in Fig. 11, and out of contact with annular disc 206. Annular bead 210 on the interior surface of casing 175' may be provided as a seat for cup 204.

Switch housing 204 has press-fitted in its lower open end 213 (again as viewed in Fig. 11) a metal sleeve 214 having upper and lower lips 215 and 216 respectively. Upper lip 215 is electrically connected to annular metal contact disc 206 by means of said conducting wire 211. Metal sleeve 214 has an exterior first insulating cylinder 217 press-fitted thereon and retained between lower lip 216 and the lower most surface of switch housing 204 to thereby clamp the edge portion of switch housing 204 that surrounds lower open end 213 between the upper edge of cylinder 217 and upper lip 215 of sleeve 214. Thus metal sleeve 214 is fixedly mounted on switch housing 204. Interiorly of metallic sleeve 214 is a press-fitted second insulating cylinder 218 and closing off the upper open end of cylinder 218 and overlying the upper lip 215 of sleeve 214 is an insulating and spring-mounting disc 219. A spring 220 is suspended from disc 219 and is hooked to the mounting 198 for vibrator 197 that insulatedly supported in casing 175 as referred to hereinbefore. The upper end of conducting wire 203 is connected to the metallic mounting 221 for metallic slip ring 222 that surrounds the exterior insulating cylinder 217 in a loose fit to permit riding therealong from the position shown in Fig. 11 wherein metallic slip ring 222 contacts lower lip 216 of metallic sleeve 214 to positions along the surface of exterior insulation cylinder 217 wherein slip ring 222 is effectively insulated from metallic sleeve 214.

In the use of this embodiment of the invention, after the device has been connected to the tab of the slide fastener by any of the means referred to above, the casing 175 may be affixed to a top edge 211 of trousers or garment 212, in the position shown in Fig. 12. This is done by holding casing 175 in the desired position with rod 179 down behind the rear surface of trousers or garment 212 with the use of manipulator 181 until rod 179 assumes the position of 179*a*. At such time, due to the angle provided for axis 178 of bearing 177,

ball 180 on the end of rod 179 will effectively grip the material of the garment between it (ball 180) and the surface of casing 175, as will be clear, to affix casing 175 in the tab retaining position. When it is desired to pull the tab of the slide fastener to open position, rod 179 is lifted by means of manipulator 181 to withdraw ball 180 from wedging engagement with garment 212 held between ball 180 and casing 175. The device comprising casings 175, 175' may then be dropped, at which time the device is suspended in the inverted position shown in Fig. 11.

With casing 175 suspended as shown in Fig. 11, the weight thereof is sufficient to pull downwardly against the biasing action of spring 209 until annular contact ring 206 abuts disc 208 on the end of rod 184. At the same time the weight (including dry cell 188, solenoid 195, vibrator 197, etc.) of casing 175, is sufficient to pull downwardly against the biasing action of spring 220 until metallic slip ring 222 abuts the lower lip 216 of metallic sleeve 214. In such position of parts and with resilient vibrator 197 in the full line position shown, a circuit including dry cell 188 is completed via metal contact 191, connecting wire 194, solenoid coil 195, connecting wire 196, vibrator 197, contact 201, wire 203, metallic mounting 221, metallic slip ring 222, lower lip 216, sleeve 214, upper lip 215, conducting wire 211, annular disc 206, spring 209, casing 175', casing 175, cap 176, spring 190 and metal surface 189 of dry cell 188. Energization of solenoid core 193 thus being caused, vibrator 197 is pulled to flexed position 197A shown in dotted lines out of abutment with contact 201. This immediately breaks the circuit and causes deenergization of core 193, whereby vibrator 197 snaps back into abutment with contact 201 to remake the circuit. This make and break action just described continues repeatedly as long as casings 175, 175' are suspended in inverted position on the tab of the slide fastener, whereby vibrator 197, in alternately striking contact 201 and stop 199, continuously causes an audible signal amplified by the increased sound space formed by the extension of the device by the relative position of casings 175 and 175'. Thus, the wearer is kept informed of the open condition of his slide fastener. Upon closing of the slide fastener, the device comprising casings 175 and 175' may again be affixed to the edge of garment 212 in righted position, as already described with reference to Fig. 10, whereby spring 209 lifts disc 208 out of contact with annular contact 206 to break the circuit and spring 220 causes telescoping of casing 175 within 175' to move slip ring 222 out of contact with lip 216 to cause a second break in the circuit. This renders the audible signal silent until the next use even though disc 208 may come into contact 206 inadvertently due to possible pulling on cord 174 while the device is in retaining position.

From the above description, it is thought that the various embodiments and advantages of our invention will be readily apparent to those skilled in the art, as will the possibilities of interchanging certain features of specific embodiments with those of other embodiments, with or without modification. Various changes in detail of the embodiments shown may also be made without departing from the spirit, or losing the primary advantages of the invention, as will also be understood. As will be clear, those metals and other materials will be chosen for fabricating the devices of the present invention in accordance with the desires of those skilled in the art and also depending upon the type and kind of audible signal desired; i.e. as to loudness and tone, or frequency thereof, etc.

The present application is a continuation-in-part of our copending U.S. application, Serial No. 651,961, filed April 10, 1957 and now U.S. Patent No. 2,886,825.

We claim:

1. A combined retaining and signaling device for garment slide fasteners, comprising: a housing; attaching means mounted on said housing and adapted to be connected to the tab of a garment slide fastener; mounting means for supporting said housing in detachable relationship on the garment with which the slide fastener is associated; audible signaling means carried by said housing, said audible signaling means comprising an expandable sound chamber and a movable sounder element supported therein; means positively biasing said expandable sound chamber toward expanded condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; and means for retaining said expandable sound chamber in collapsed condition and rendering said movable sounder element immovable when said housing is supported by said mounting means.

2. A combined retaining and signaling device for garment slide fasteners, comprising: a housing; attaching means mounted on said housing and adapted to be connected to the tab of a garment slide fastener; mounting means for supporting said housing in detachable relationship on the garment with which the slide fastener is associated; audible signaling means carried by said housing, said audible signaling means comprising an expandable sound chamber and a movable sounder element supported therein; means positively biasing said expandable sound chamber toward expanded condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; and means to cause said expandable sound chamber to be compressed against the action of said biasing means and said movable sounder element to be rendered immovable when said housing is supported by said mounting means.

3. A combined retaining and signaling device for garment slide fasteners, comprising: a housing; attaching means mounted on said housing and adapted to be connected to the tab of a garment slide fastener; mounting means for supporting said housing in detachable relationship therewith, said mounting means comprising means adapted to be supported on the garment wth which the slide fastener is associated; audible signaling means carried by said housing, said signaling means comprising an expandable sound chamber and a movable sounder element supported therein; means positively biasing said expandable sound chamber toward expanded condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; and means to cause said expandable sound chamber to be compressed against the action of said biasing means and said movable sounder element to be rendered immovable when said housing is supported by said mounting means.

4. A combined retaining and signaling device for garment slide fasteners, comprising: a housing comprising two sections movable in telescoping relationship to each other; attaching means mounted on said housing and adapted to be connected to the tab of a garment slide fastener, mounting means for supporting said housing in detachable relationship on the garment with which the slide fastener is associated; audible signaling means comprising a movable sounder element carried by said housing and encompassed by said two sections which form an expandable sound chamber therefor; means positively biasing said two sections forming said sound chamber toward untelescoping condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; and means for retaining said two sections in telescoped relationship and rendering said movable sounder element immovable when said housing is supported by said mounting means.

5. A combined retaining and signaling device for gar-

ment slide fasteners as claimed in claim 4 wherein said biasing means comprises a spring element.

6. A combined retaining and signaling device for garment slide fasteners as claimed in claim 4 wherein said biasing means comprises a weight.

7. A combined retaining and signaling device for garment slide fasteners, comprising: a housing comprising two flanged wall sections attached to each other at one end by a third section in telescoping relationship to each other; attaching means mounted on said third section and adapted to be connected to the tab of a garment slide fastener, mounting means for supporting said housing in detachable relationship on the garment with which the slide fastener is associated, said mounting means comprising a flanged tab attached to one of said wall sections and encompassing at least a portion of said other wall portion, audible signaling means comprising a movable sounder element attached to said third section and encompassed by said two flanged sections that form a sound chamber therefor; means biasing said two flanged sections forming said sound chamber away from each other to provide an expanded sound chamber when said housing is detached from the garment and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; said flanged wall sections, said flanged tab, and said biasing means being so constructed and arranged that when said housing is mounted by the aforesaid mounting means on a web attached to a garment, said wall sections are compressed against the action of said biasing means and said movable sounder element is rendered immovable therebetween.

8. A combined retaining and signaling device for garment slide fasteners as claimed in claim 7 wherein said biasing means comprises said third section and said third section is bent and resilient.

9. A combined retaining and signaling device for garment slide fasteners, comprising: a housing comprising two wall portions connected at one end of each by a connecting section and attaching means mounted on said housing and adapted to be connected to the tab of a garment slide fastener; mounting means for supporting said housing in detachable relationship therewith; said mounting means comprising an open-ended sleeve, and attachment means thereon adapted to be supported on the garment with which the slide fastener is associated; audible signaling means comprising a sound chamber formed by said connected wall portions and a movable sounder element supported therein; means biasing said sound chamber toward expanded condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; said open-ended sleeve and said housing being so dimensioned that when the latter is inserted into the former, said sound chamber is compressed against the action of said biasing means and said movable sounder element is rendered immovable.

10. A combined retaining and signaling device for garment slide fasteners, comprising: a housing comprising two flanged wall portions connected at one end of each by a connecting section, and attaching means mounted on said connecting section and adapted to be connected to the tab of a garment slide fastener; mounting means for supporting said housing in detachable relationship therewith; said mounting means comprising an open-ended sleeve, and attachment means thereon adapted to be supported on the garment with which the slide fastener is associated; audible signaling means carried within said housing, said audible signaling means comprising a sound chamber formed by said connected flanged wall portions, and a movable sounder element supported therein and attached to said connecting sections; means biasing said flanged wall portions forming said sound chamber toward expanded condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; said open-ended sleeve and said housing being so dimensioned that when the latter is inserted into the former, said sound chamber is compressed between said flanged wall portions against the action of said biasing means and said movable sounder element is rendered immovable.

11. A combined retaining and signaling device for garment slide fasteners as claimed in claim 10 wherein said connecting section is resilient and said biasing means comprises said connecting section.

12. A combined retaining and signaling device for garment slide fasteners, comprising: a housing comprising two flanged wall portions connected at one end of each by a connecting section, and attaching means mounted on said housing and adapted to be connected to the tab of a garment slide fastener; mounting means for supporting said housing in detachable relationship therewith; said mounting means comprising an open-ended sleeve and attachment means thereon adapted to be supported on the garment with which the slide fastener is associated; audible signaling means carried within said housing, said audible signaling means comprising a sound chamber formed by said connected wall portions and a movable sounder element supported therein; means biasing said sound chamber toward expanded condition when said housing is detached from said mounting means and freely suspended on said attaching means whereby said movable sounder element is free to move in said expanded sound chamber; means mounted on one of said wall portions for limiting the expanded condition of said sound chamber by engagement with the other of said wall portions; said open-ended sleeve and said housing being so dimensioned that when the latter is inserted into the former, said sound chamber is compressed between said flanged wall portions against the action of said biasing means and said movable sounder element is rendered immovable.

13. A combined retaining and signaling device for garment slide fasteners as claimed in claim 12 wherein said sound chamber expansion limiting means also functions as stop means to limit the extent of insertion of said housing into said open-ended sleeve.

14. A combined retaining and signaling means as claimed in claim 12 wherein stop means are located on said housing to limit the extent of insertion of said housing into one end of said open-ended sleeve after the end of said housing remote from said connecting section protrudes from the other end of said open-ended sleeve.

15. A combined retaining and signaling means as claimed in claim 14 wherein said end of said housing that protrudes from the other end of said open-ended sleeve is provided with means for manually squeezing said wall portions toward each other.

16. A combined retaining and signal means as claimed in claim 15 wherein said housing is also provided with means for releasably locking said housing in said sleeve.

17. A combined retaining and signaling device for garment slide fasteners, comprising: a housing formed by two telescoping cylinders, attaching means mounted on one of said cylinders and adapted to be connected to the tab of a garment slide fastener; mounting means on the other of said cylinders for supporting said housing in detachable relationship with the garment with which the slide fastener is associated; audible signaling means carried within said housing, said audible signaling means comprising an expandable sound chamber defined by said two telescoping cylinders and a movable sounder element supported therein within said sound chamber and mounted in the interior of said other cylinder; electrical means housed in said other cylinder for driving said movable sounder element, first switch means for rendering said electrical means operative, first resilient means for urging

said first switch means to inoperative position; second resilient means urging said two telescoping cylinders towards nested relationship with respect to each other, second switch means for rendering said electrical means operative; weight means comprising said electrical means and said movable sounder element for biasing said other cylinder out of nesting engagement with said one cylinder against the urging action of said second resilient means and for closing said first and said second switch means when said housing is detached from the garment by said mounting means; and freely suspended on said attaching means whereby said movable sounder element is caused to move in said expanded sound chamber.

18. A combined retaining and signaling device for garment slide fasteners, comprising: a housing formed by two cylinders in telescoping relationship; attaching means mounted on one of said cylinders and adapted to be connected to the tab of a garment slide fastener; mounting means on the other of said cylinders for supporting said housing in detachable relationship with the garment with which the slide fastener is associated; audible signaling means carried within said housing, said audible signaling means comprising an expandable sound chamber defined by said two telescoping cylinders and a movable sounder element supported therein within said sound chamber and mounted in the interior of said other cylinder; electrical means in said housing for driving said movable sounder element into repeated contact with a stop and comprising a solenoid and an electric circuit including a dry cell housed in said other cylinder, first switch means for said circuit, first resilient means for urging said first switch means to open position; second switch means for said circuit, second resilient means for urging said two telescoping cylinders towards nested relationship with each other and for opening said second switch means, weight means comprising said movable sounder element, said solenoid and said dry cell for biasing said other cylinder out of nesting relationship with said one cylinder against the urging action of second resilient means to cause closing of said second switch means and for biasing said first switch to closed position against the urging action of said first resilient means when said housing is detached from the garment by said mounting means freely suspended on said attaching means whereby said movable sounder element is driven by said electrical means to move in said expanded sound chamber, and said expandable sound chamber is retained compressed against the action of said second resilient biasing means and said first and second switch means are permitted to be urged to open position by said first and said second resilient means, respectively, whereby said movable sounder element is rendered immovable after said cylinders are telescoped, and the housing is inverted and supported on the garment by said mounting means.

19. A combined retaining and signaling device for garment slide fasteners as claimed in claim 18 wherein said first switch means are mounted wholly within said one cylinder and at least part of said second switch means is mounted on said other cylinder.

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