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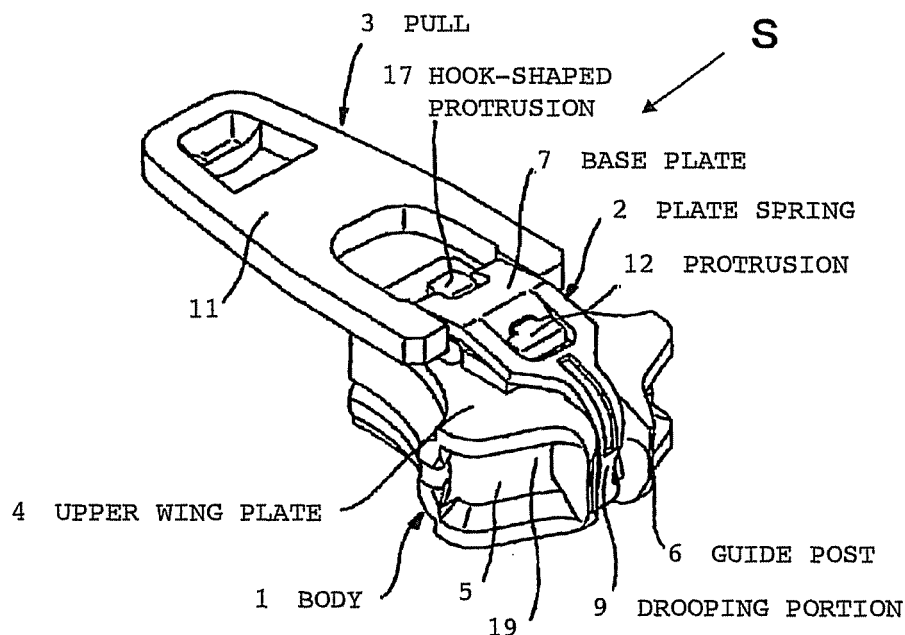
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(54) **Member having spring properties and product employing same**

(57) In a member having spring properties, such as a slider for a slide fastener or a snap button, the member main unit is composed of copper or a copper-based alloy, and the spring member attached to the member main

unit is also composed of copper or a copper-based alloy. This eliminates the trouble of having to separate the structural components when recycling copper and also allows regenerated ingots to be readily prepared through a remelting process, thereby lowering recycling costs.

FIG. 2



Description

[0001] The present invention relates to a member composed of a member main unit made of copper or a copper-based alloy and a spring member attached thereto.

[0002] Members such as sliders for fasteners, snap buttons, and electrical component connectors are conventionally composed of a member main unit made of copper or a copper-based alloy and a spring member attached thereto. Iron alloys are used for such spring members because of the need for high strengths, corrosion resistance, and spring properties. Stainless steel materials are also often used because of the need for needle detector compatibility in the above fastener slider and snap button applications (see Japanese Patent Publication Nos. 2003-277890A and H8-269639A).

[0003] Meanwhile, the rising costs of metal materials recently (especially copper and zinc) have led to a greater need to recycle the copper and copper alloys that are used in the aforementioned members.

[0004] However, in members comprising a spring member made of stainless steel attached to a member main unit made of copper or a copper-based alloy (referred to below as "members endowed with spring properties"), the member main unit and the spring member are different materials, making it necessary to separate the two, which results in poor recyclability.

[0005] In sliders for fasteners, for example, stainless steel materials are employed as the catch (lock pin) used for the slider lock mechanism and the spring member that allows the catch to function, so when the slider is recycled (re-melted), the spring member must be separated from the body main unit of the slider composed of the copper alloy, compromising the recyclability. The same problems occur in snap buttons and connector members.

[0006] Stainless steel lock pins doubling as catches and springs are also used in sliders for jeans, for example, but the copper alloy slider main unit and the stainless steel lock pin are not the same color, detracting from the design.

[0007] An object of the present invention is to improve the recyclability of members composed of member main units made of copper or copper-based alloys and spring members attached thereto.

[0008] The inventors perfected the present invention upon discovering that the problems regarding the recyclability of the members noted above can be resolved by using a spring member composed of a copper-based alloy as the spring member in members composed of a member main unit made of copper or a copper-based alloy and a spring member attached thereto.

[0009] Specifically, the present invention has a structure as described below.

(1) A member having spring properties, characterized by comprising: a member main unit comprising copper or a copper-based alloy; and a spring member comprising a copper-based alloy mounted on the member main unit.

(2) The member having spring properties according to (1) above, characterized in that the spring member has 0.2% resistance of at least 1000 N/mm² and a spring threshold of at least 700 N/mm².

(3) The member having spring properties according to (1) above, characterized in that the spring member has 0.2% resistance of at least 1200 N/mm² and a spring threshold of at least 1000 N/mm².

(4) The member having spring properties according to any of (1) through (3) above, characterized in that the spring member has a hardness Hv not greater than 400, tensile elongation of at least 5%, corrosion resistance equal to or greater than red brass, and a needle detector compatibility corresponding to A.

(5) The member having spring properties according to any of (1) through (4) above, characterized in that the spring member does not comprise lead, mercury, cadmium, or hexavalent chromium.

(6) The member having spring properties according to any of (1) through (5) above, characterized in that the member having spring properties is a body of a slider for a slide fastener, the member main unit is a main body of the slider, and the spring member is mounted on the main body.

(7) A slider for a slide fastener comprising a body and a pull, characterized in that the body is the member having spring properties according to (6) above, and the pull comprises copper or a copper-based alloy.

(8) A slide fastener comprising elements, stops, and a slider, characterized in that the elements and/or stops consist of copper or a copper-based alloy, and the slider is the slider according to (7) above.

(9) The member having spring properties according to any of (1) through (5) above, characterized in that the member having spring properties is a female unit of a snap button, the member main unit is a button body, and the spring member is mounted on the button body.

(10) A snap button comprising a male unit and a female unit, characterized in that the male unit consists of copper or a copper-based alloy, and the female unit comprises the member having spring properties according to (9) above.

[0010] The use of the member having spring properties in the present invention eliminates the trouble of having to separate the members and also allows regenerated ingots to be readily prepared through a remelting process, thereby lowering recycling costs.

[0011] In addition, since both the member main unit and the spring member are composed of copper or a copper-

based alloy, the color will be the same, resulting in better design properties (attractive appearance).

[0012] FIG. 1 is a schematic illustration of a slide fastener.

[0013] FIG. 2 is a perspective view of slider for which the present invention is applicable.

[0014] FIG. 3 is an exploded perspective view of the slider in Figure 2.

[0015] FIG. 4 is a cross section of the slider in Figure 2.

[0016] FIG. 5 is an exploded perspective view of another example of a slider for which the invention is applicable.

[0017] FIG. 6 is a longitudinal cross section along center line in longitudinal direction of the slider in Figure 5.

[0018] FIG. 7 is a cross section of a snap button.

[0019] FIG. 8 is a cross section of another example of a snap button.

[0020] The member having spring properties in the invention will be described below based on the drawings using a fastener slider and a button as examples. The slide fastener F will be described first.

[0021] FIG. 1 schematically illustrates a slide fastener. As illustrated in FIG. 1, the slide fastener F is composed of a pair of fastener tapes T, a core A formed on one side of the faster tape T, elements E secured (attached) by caulking at certain intervals on the cores A of the fastener tapes T, a top stop TS and bottom stop BS secured by caulking to the cores A of the fastener tapes T at the top and bottom elements E, and a slider for a slide fastener (referred to below as "slider") S that is disposed between the pairs of facing elements E and that is slidable back and forth to allow the elements E to be engaged or disengaged (closed or opened). In the above, the assembly of the elements E attached to the cores A of the fastener tapes T is referred to as a slide fastener chain C. Although not illustrated, the bottom stop BS may be an opening and fitting device composed of an insert pin, box pin, and retaining box allowing the pair of slide fastener chains C to be separated by opening operation using the slider S.

[0022] Copper or a copper-based alloy is primarily used as the material for the slider S in the present invention. A needle detector compatible copper or copper-based alloy that is compatible with needle detectors is also preferably used in the interests of recyclability for the elements E, top stop TS, and bottom stop BS. The slider S is described in detail below.

[0023] FIG. 2, FIG. 3, and FIG. 4 illustrate an example of a slider S for a slide fastener with automatic stops in which a plate spring is used as the spring member. FIG. 2 is a perspective view of the entire structure of the slider, FIG. 3 is an exploded perspective view of the relation between the parts, and FIG. 4 is a cross section of the slider in FIG. 2 (except that the pull position is different).

[0024] The slide body 1 is formed of an upper wing plate 4, lower wing plate 5, and guide post 6 that connect the upper wing plate 4 and the lower wing plate 5. The plate spring 2 has a plate shape with the both ends being bent, a base plate 7 formed in the middle, a locking pawl 8 formed at one end, and an anchoring drooping portion 9 formed at the other end. A axis 10 is formed at one end of the pull 3, allowing it to rotatably pivot on the body 1, and a pull component 11 formed at the other end.

[0025] For the body 1, a protrusion 12 that protrudes upward in the shape of a hook is also provided in the middle on the forward side, that is, the shoulder opening side, of the upper wing plate 4. A protruding engagement protrusion 13 is provided in the middle of the distal end of the protrusion 12 and is fitted to a through hole 25 in the engagement tongue 24 of the plate spring 2 described below. A abutting contact 14 capable of contact with the engagement tongue 24 is formed at the distal end of the protrusion 12 on either side of the engagement protrusion 13, and the abutting contact 14 is formed in the vertical plane intersected at right angles by the line of extension relative to the upper surface of the upper wing plate 4. A through hole 15 passing through to an element guide groove 19 is provided in the base of the protrusion 12, and a support platform 16 protrudes from both sides of the base of the protrusion 12 to allow the forward-inclined plate spring 2 to be placed there.

[0026] A hook-shaped protrusion 17 in the shape of a hook tilted toward the rear protrudes from the middle on the posterior side, that is, posterior opening side, of the upper wing plate 4, the distal end of the hook-shaped protrusion 17 is bent to provide an engagement component 18 that fits into a hook hole 26 in the plate spring 2, and a pawl hole 20 passing through to the element guide groove 19 is provided in the base of the hook-shaped protrusion 17. A dent groove 21 is also provided in the front surface of the guide post 6, and a generally right triangular detent 22 that is flat at the bottom and inclined at the top is provided on either side of the dent groove 21, so as to engage the detent portion 23 of the plate spring 2. Instead of being concave, the dent groove 21 may also be in the form of a vertical shaft piercing through the guide post 6 connecting the top and bottom part.

[0027] The plate spring 2 is in the form of a generally collapsed U-shape, with the locking pawl 8 provided at one end and the narrow drooping portion 9 provided at the other end. The detent portion 23 that is projecting sideways protrudes at the distal end of the drooping portion 9 and engages with the detent 22 provided on the guide post 6. An opening 28 is provided in the base plate 7 in the middle of the plate spring 2, the extended engagement tongue 24 is oriented forward from the edge of the opening 28 and bent downward, the through hole 25 into which the engagement protrusion 13 of the protrusion 12 is fitted is provided in the middle of the engagement tongue 24, and the hook hole 26 into which the engagement component 18 of the posterior hook-shaped protrusion 17 is fitted is provided in the plate spring 2 adjacent to the locking pawl 8 to prevent the floating of the locking pawl 8.

[0028] The pull 3 has the axis 10 provided at one end and the pull component 11 provided at the other end. When the pull 3 is attached to the body 1 and laid longitudinally, the axis 10 protrudes out biased to the side facing the body 1, resulting in the formation of a cam 27 wherein the cross section of the axis 10 is a long rectangle along the longitudinal direction of the pull 3. The pull 3 is attached to the body 1, so that the plate spring 2 is held up when the pull 3 is pulled up.

[0029] In the slider equipped with the assembled automatic stop mechanism, when the pull 3 is placed upright as illustrated in FIG. 4, the plate spring 2 is held up against the repulsing force by means of the cam 27 of the pull 3, and the locking pawl 8 is retracted from the element guide groove 19, allowing the slider to freely slide. When the pull 3 is collapsed to its original position, the locking pawl 8 advances into the element guide groove 19 and is inserted between the elements, stopping the slider. When the pull 3 is collapsed toward the front of the body 1, the plate spring 2 remains held up by the biased cam 27, allowing the slider to freely slide forward.

[0030] In the present invention, the plate spring and the parts forming the slider are all made of copper or a copper-based alloy, resulting in very good recyclability.

[0031] FIGS. 5 and 6 illustrate an example of a slider for a slide fastener with an automatic stop device using a coil spring as the spring member in another embodiment of the invention.

[0032] FIG. 5 is a vertical exploded perspective view of a slider S, and FIG. 6 is a longitudinal cross section immediately before the pull is attached.

[0033] A concave pull retainer 35 is disposed downwardly oriented from the diamond portion 33 of the upper wing plate 32 toward the rear opening 34 of the slider S. A locking pawl 37 is vertically rotatably attached to a location near the diamond portion 33 of the internal space 36 of the pull retainer 35. Formed in the locking pawl body 37 are an engagement clasp 49 that protrudes from an engagement hole 47 in generally the middle of the upper wing plate 32 to where the rows of teeth are located, and an actuation groove 52 that is open toward the posterior opening 34 and that houses the attachment shaft 51 of the pull. The locking pawl 49 is energized by a spring 55 so as to always protrude out of the engagement hole 47, and the gap 57 between the upper wing plate 32 and the end on the posterior opening 34 side of the pull retainer 35 serves as the gap into which the attachment shaft 51 of the pull 50 is inserted. A member 58 for closing the insertion gap is disposed in the gap 57 so as to slide between the gap closing position and the gap opening position near the diamond portion 33 side.

[0034] This slider has been disclosed in Japanese Utility Model Publication No. S4-32974Y2 and will therefore not be further elaborated here, but is a structure in which the pull 50 is removable relative to the slider S by means of the above structure, thereby always allowing the pull 50 to be readily removed or attached. As such, even when the pull 50 is not made of copper or a copper-based alloy, the pull 50 can be readily removed from the slider S when recycled, so that the pull 50 does not need to be made of copper or a copper-based alloy.

[0035] In the present invention, the spring and the parts forming the slider are all made of copper or a copper-based alloy, resulting in very good recyclability.

[0036] Snap buttons in other embodiments of the invention will be described based on FIGS. 7 and 8. In the following, "surface members" refer to members disposed primarily on the outer surface of a substrate, and "base members" refer to members primarily disposed on the under side of the substrate.

[0037] FIG. 7 is a cross section illustrating a snap button SB1 as an example of a snap button for which the invention is applicable. The snap button SB1 is composed of a female button 101 and a male button 102. The female button 101 is composed of a female member 103 (base member) in which is formed a concavity 103a equipped with an elastic member (spring member) that engages with the male button 102 (described below) on the inner peripheral surface, and a female fixing member 105 (surface member) that is thrust into the substrate 90 and secures the female member 103. The male button 102 is composed of a male member 104 (surface member) having an expanding head 104a that engages with the elastic member of the female member 103, and a male fixing member 106 (base member) that is thrust into the substrate 90 and secures the male member 104.

[0038] FIG. 8 is a cross section illustrating a snap button SB2 in another embodiment of a snap button. The snap button SB2 is composed of a female button 101 and male button 102 in the same manner as the snap button SB1 above. The female button 101 is composed of covered member 107, a female fixing member 105 that is inserted into the covered member 107, that prevents the covered member 107 from becoming deformed, that is thrust into the substrate 90, and that secures the covered member 107 and a female member 103 described below on either side of the substrate 90 (the covered member 107 and female fixing member 105 are together a surface member), a female member 103 inside of which a concavity 103a that houses the male button 102 is formed, and a spring 108 (the female member 103 and spring 108 are together a base member) that is disposed in the concavity 103a of the female member 103 and has elasticity to engage with a male button 102 describe below. The male button 102 is composed of a male member 104 (surface member) having an expanding head 104a that engages with a spring 108 having elasticity disposed in the concavity 103a of the female member 103 to provide elasticity, and a male fixing member 106 (base member) that is thrust into the substrate 90 and secures the male member 104.

[0039] The spring member (elastic member and spring), the surface members and base members in the above snap buttons SB1 and SB2 are all composed of copper or a copper-based alloy, resulting in very good recyclability.

[0040] The spring member made of copper or a copper-based alloy in the invention is preferably made of a high strength copper alloy endowed with the following properties.

0.2% resistance: at least 1000 N/mm² (and preferably at least 1200 N/mm²)

Spring threshold: at least 700 N/mm² (and preferably at least 1000 N/mm²)

Hardness: no more than Hv 400

Tensile elongation: at least 5%

Corrosion resistance: equal to or greater than red brass (85 Cu/15 Zn)

Needle detector compatibility: corresponding to A

Alloy components: free of lead, mercury, cadmium, and hexavalent chromium

[0041] The above properties are particularly required in spring members used in snap buttons and sliders for fasteners in particular.

[0042] A copper-based spring member with a 0.2% resistance of at least 1000 N/mm² and a spring threshold of at least 700 N/mm² can be used for practical purposes. Slide fasteners and snap buttons are used under severe conditions, depending on the application. Examples include stone washed jeans or autoclaving in clean rooms or the like. In consideration of such severe conditions, the 0.2% resistance is preferably at least 1200 N/mm² and the spring threshold is preferably at least 1000 N/mm².

[0043] The hardness and tensile elongation are stipulated at the above values in the interests of providing enough durability for actual use and ease of manufacturing/processing (such as press molding).

[0044] Furthermore, slide fasteners, snap buttons, and the like are preferably free of lead, mercury, cadmium, and hexavalent chromium because they may be used in personal effects such as clothing and shoes.

[0045] In terms of the corrosion resistance noted above, copper alloys used in fasteners need to be resistant to a variety of things, including chemicals such as acids and alkalis, but must above all be resistant to stress cracking, also referred to as season cracking. In the event of residual stress due to processing, exposure to ammonia atmospheres may result in cracks, which tend to become more pronounced as the zinc content of copper-zinc alloys increases. For example, brass (65 Cu/35 Zn) is more susceptible to cracking than red brass (85 Cu/15 Zn), and there is a risk that the teeth will become broken under some conditions of use. Thus, even though brass is stronger than red brass, red brass is more suitable as materials for fasteners from the standpoint of stress cracking. Similarly, spring members featuring the use of copper alloys need to be resistant to stress cracking. This therefore means that in the present invention, the copper alloy for the spring member has at least the resistance to stress cracking of red brass in the JIS H 4201 ammonia test.

[0046] Specific tests are given below.

(Corrosion Resistance Test)

[0047] Samples are suspended for 2 hours in a dessicator with the samples positioned at the height of 50 to 100 mm from the surface of 12% ammonia water, and the samples are then examined for stress cracking. Because the copper alloy used for the spring member is in the form of wire or line, corrosion resistance of the samples can be determined by the tensile strength. Stress cracking will be revealed by a decrease in the tensile strength.

[0048] Needle detector compatibility will now be discussed. A process for detecting contamination by needles that have broken off during the sewing process is needed in processes where clothing with slide fasteners and/or buttons is sewn to produce final products. At that time, the structural components of the slide fasteners and buttons must not activate the needle detector. The members must therefore have a magnetic permeability of no more than 1.005 in a 1 kOe magnetic field and a magnetization of no more than 550 memu/g in a 18 kOe magnetic field, and preferably a magnetic permeability of no more than 1.003 in a 1 kOe magnetic field and a magnetization of no more than 440 memu/g in a 18 kOe magnetic field.

[0049] In magnetostatic field type needle detectors which measure variations in magnetic flux density that are caused when metal passes through at a constant rate in a magnetic flux, needle detection capacity is assessed based on a relative value in relation to a standard value, where the variation in magnetic flux density corresponding to a steel ball 0.8 mm in diameter is set to 100 to 120 as the standard value (indicator), and the needle detection level is the measured result of the object under analysis. That is, when the needle detection level of the object under analysis is at or below the standard value, it is no greater than that corresponding to a steel ball 0.8 mm in diameter, and if the needle detection level of the object under analysis is at or below the needle detection level of a steel ball 1.2 mm in diameter, it is no greater than that corresponding to a steel ball 1.2 mm in diameter. The needle detection capacity is expressed by whether or not the result is at or below any of the values for steel balls 0.8, 1.2, or 1.5 mm in diameter. If the result is at or below that corresponding to a steel ball 0.8 mm in diameter, it means that broken needles of the smallest special size used in sewing can be detected. If the result is at or below that corresponding to a steel ball 1.2 mm in diameter, it means that broken needles of the normally used size can be detected. The expression "corresponding to A" in the specification of the present application means a level no greater than that for a steel ball 0.8 mm in diameter.

[0050] In the present invention, the needle detection capacity is preferably no more than that of a steel ball 1.2 mm in diameter, and ideally no more than that of a steel ball 0.8 mm in diameter. Also in the present invention, when the alloy being measured is in the form of a sample measuring 15 X 15 X 0.4 mm, the needle detection level of the object being measured will be the result obtained as the object moves vertically to the magnetic flux. In case of slide fasteners or buttons, the objects to be measured are the finished products or the parts, and the needle detection level will also be the result obtained as the object moves vertically to the magnetic flux.

[0051] The invention is illustrated in greater detail by, but is not limited to, the following embodiments of the invention.

Examples

(Production of Spring Member)

[0052] A spring member 1 and a spring member 2 having the compositions given in Table 1 as the spring member copper alloys were produced in the following manner.

[0053] The compositions in Table 1 were measured out, melted in the usual manner in a 30 Kg high frequency induction melting furnace, cast to a thickness of 10 mm and a width of 120 mm, then solution-treated, cold rolled to 3 mm, subjected to process annealing, again cold rolled to 1.5 mm, and subjected to final annealing to a size of 120 X 300 mm.

[0054] The material was then furthermore cold rolled to a reduction ratio of 60% and age hardened by heat treatment. the resulting material was used as samples. The "0.2% resistance" and "spring threshold" of the samples at this point in time are given in Table 2.

[0055] The samples were prepared to a size of 15 X 15 X 0.4 mm to determine the needle detection levels. The needle detection levels were determined using a magnetostatic field type needle detector which measures variations in magnetic flux density that are caused when the metal passes through at a constant rate in a magnetic flux, wherein the variation in magnetic flux density corresponding to a steel ball 0.8 mm in diameter is set to 100 to 120 as the standard value (indicator), and the needle detection level is the measured result of the object under analysis. Table 2 gives the results determined based on the above. The numerical figures in the table indicate the relative values in relation to the standard value above. The results in Table 2 show that the needle detection levels of the samples of the invention were a very low level of no more than 80.

Table 1

	Composition (wt%)			
	Cu	Be	Ti	impurities
Spring member 1	97.3	1.9	--	0.8
Spring member 2	96.3	--	3.2	0.5

Table 2

Properties	Spring member 1	Spring member 2
0.2% resistance (N/mm ²)	1100	1000
Spring threshold (N/mm ²)	830	880
Hardness (before age hardening)(Hv)	200	330
Tensile elongation (before age hardening) (%)	10	11
Corrosion resistance	O	O
Needle detection level	60	60
Needle detector compatibility	A	A

[0056] Table 2 shows that the spring member 1 and spring member 2 were endowed with properties suitable for spring members used in slide fasteners and snap buttons.

(Slide Fastener Application)

[0057] The plate spring 2 in FIG. 3 was prepared based on the composition and production method in "Production of Spring Member" above. The resulting plate spring 2 was assembled with a pull 3 and body 1 composed of red brass (85 Cu-15 Zn) to produce a slide fastener S composed of a copper-based alloy.

[0058] The above slider S for a slide fastener was disposed with elements E, top stop TS, and bottom stop BS composed of red brass (85 Cu-15 Zn) shown in FIG. 1 to produce a slide fastener F composed of a copper-based alloy.

[0059] The plate spring 2 above was endowed with properties suitable for sliders used in slide fasteners. The slider for use in a slide fastener and the slide fastener itself were composed of copper-based alloys, resulting in good recyclability.

[0060] It is evident that the recyclability is just as good if the spring member is used as the spring member in a button.

[0061] The member having spring properties in the present invention is extremely useful for industrial purposes because it eliminates the trouble of having to separate the structural components when recycling copper and also allows regenerated ingots to be readily prepared through a remelting process, thereby lowering recycling costs.

DESCRIPTION OF REFERENCE NUMERAL

[0062]

A: CORE

TS: TOP STOP

E: ELEMENT

S: SLIDER

E: ELEMENT

T: FASTENER TAPE

BS: BOTTOM STOP

C: SLIDE FASTENER CHAIN

SB1: SNAP BUTTON

SB2: SNAP BUTTON

1: BODY

2: PLATE SPRING

3: PULL

4: UPPER WING PLATE

6: GUIDE POST

7: BASE PLATE

8: LOCKING PAWL

9: DROOPING PORTION

10: AXIS

12: PROTRUSION

	14 :	ABUTTING CONTACT
	17:	HOOK-SHAPED PROTRUSION
5	20:	PAWL HOLE
	21:	DENT GROOVE
	22:	DETENT
10	23:	DETENT PORTION
	24:	ENGAGEMENT TONGUE
15	25:	THROUGH HOLE
	26 :	HOOK HOLE
	27:	CAM
20	32:	UPPER WING PLATE
	33:	DIAMOND PORTION
25	34:	POSTERIOR OPENING
	35:	PULL RETAINER
	37:	LOCKING PAWL body
30	38:	UPPER SURFACE
	47:	ENGAGEMENT hole
35	49:	LOCKING PAWL
	50:	PULL
	51:	ATTACHMENT SHAFT
40	52:	ACTUATION GROOVE
	56:	END PORTION
45	57:	GAP
	58:	CLOSING MEMBER
50	59:	NOTCH

Claims

1. A member having spring properties, **characterized by** comprising: a member main unit comprising copper or a copper-based alloy; and a spring member comprising a copper-based alloy mounted on the member main unit.
2. The member having spring properties according to claim 1, **characterized in that** the spring member has 0.2% resistance of at least 1000 N/mm² and a spring threshold of at least 700 N/mm².

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3. The member having spring properties according to claim 1, **characterized in that** the spring member has 0.2% resistance of at least 1200 N/mm² and a spring threshold of at least 1000 N/mm².
- 5 4. The member having spring properties according to any of claims 1 through 3, **characterized in that** the spring member has a hardness Hv not greater than 400, tensile elongation of at least 5%, corrosion resistance equal to or greater than red brass, and a needle detector compatibility corresponding to A.
- 10 5. The member having spring properties according to any of claims 1 through 4, **characterized in that** the spring member does not comprise lead, mercury, cadmium, or hexavalent chromium.
- 15 6. The member having spring properties according to any of claims 1 through 5, **characterized in that** the member having spring properties is a body of a slider for a slide fastener, the member main unit is a main body of the slider, and the spring member is mounted on the main body.
- 20 7. A slider for a slide fastener comprising a body and a pull, **characterized in that** the body is the member having spring properties according to claim 6, and the pull comprises copper or a copper-based alloy.
8. A slide fastener comprising elements, stops, and a slider, **characterized in that** the elements and/or stops consist of copper or a copper-based alloy, and the slider is the slider according to claim 7.
- 25 9. The member having spring properties according to any of claims 1 through 5, **characterized in that** the member having spring properties is a female unit of a snap button, the member main unit is a button body, and the spring member is mounted on the button body.
- 30 10. A snap button comprising a male unit and a female unit, **characterized in that** the male unit consists of copper or a copper-based alloy, and the female unit comprises the member having spring properties according to claim 9.

FIG. 1

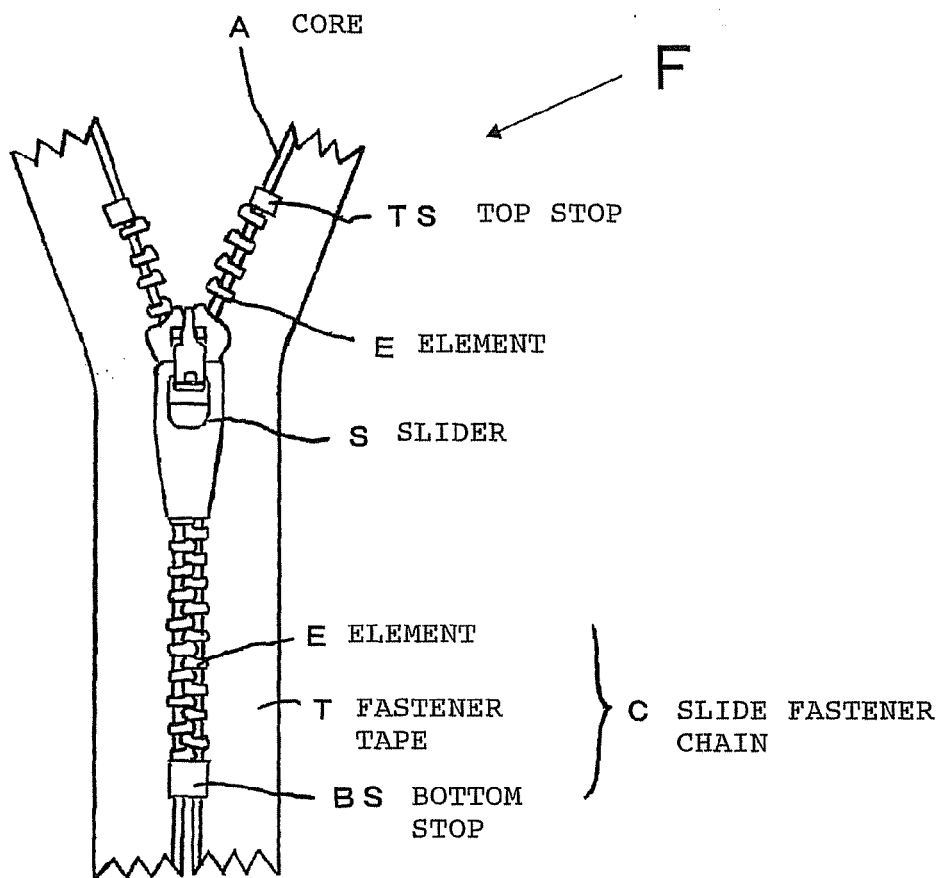


FIG. 2

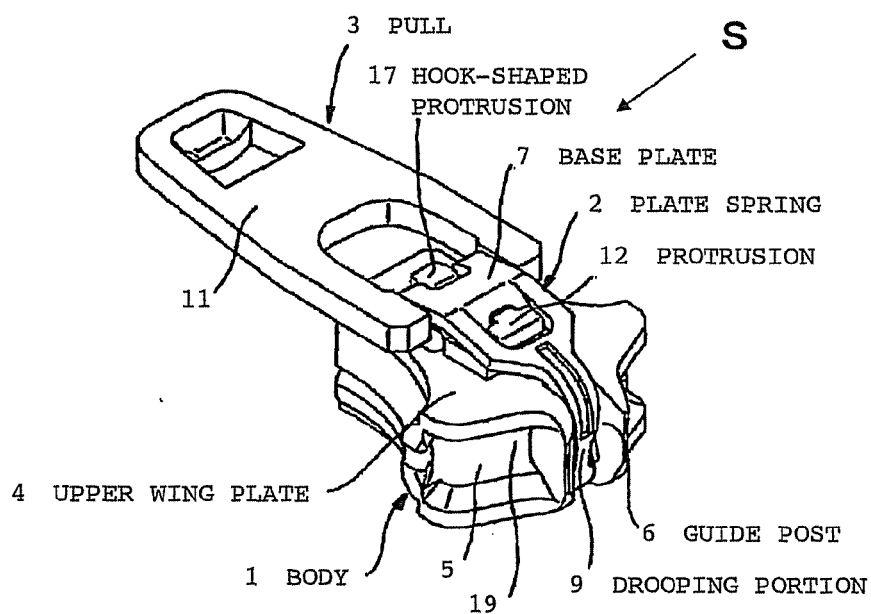


FIG. 3

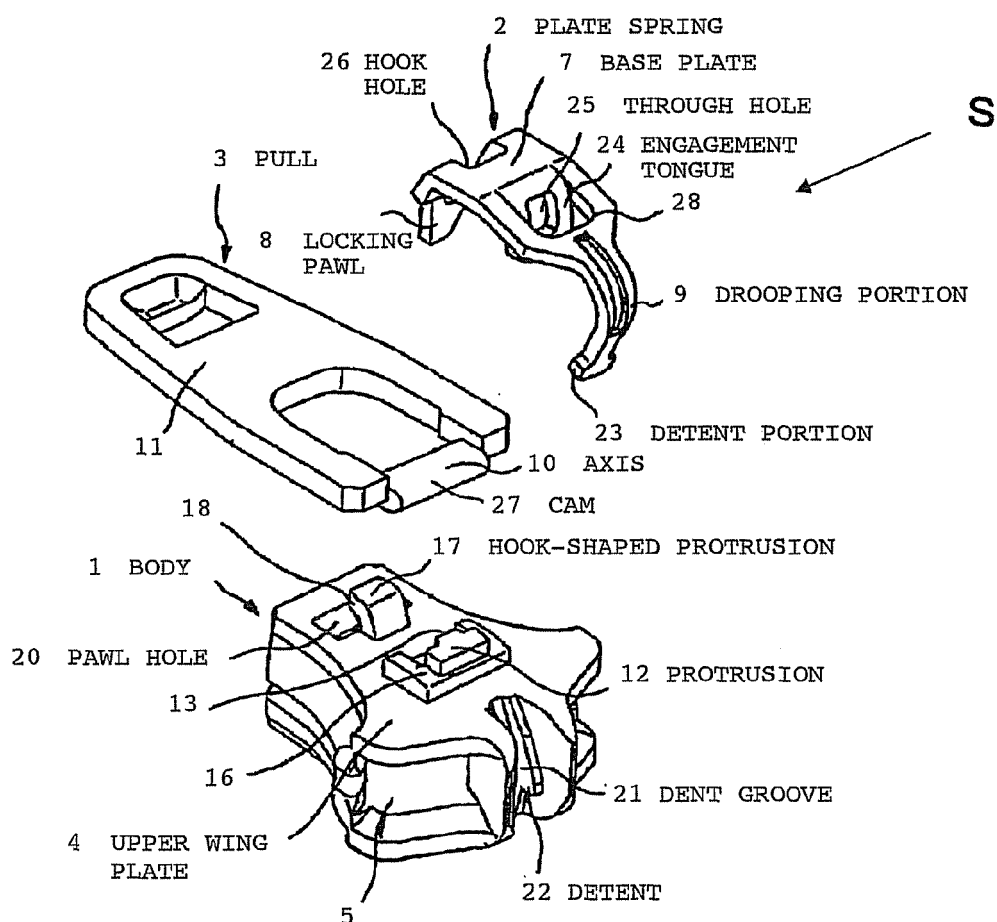


FIG. 4

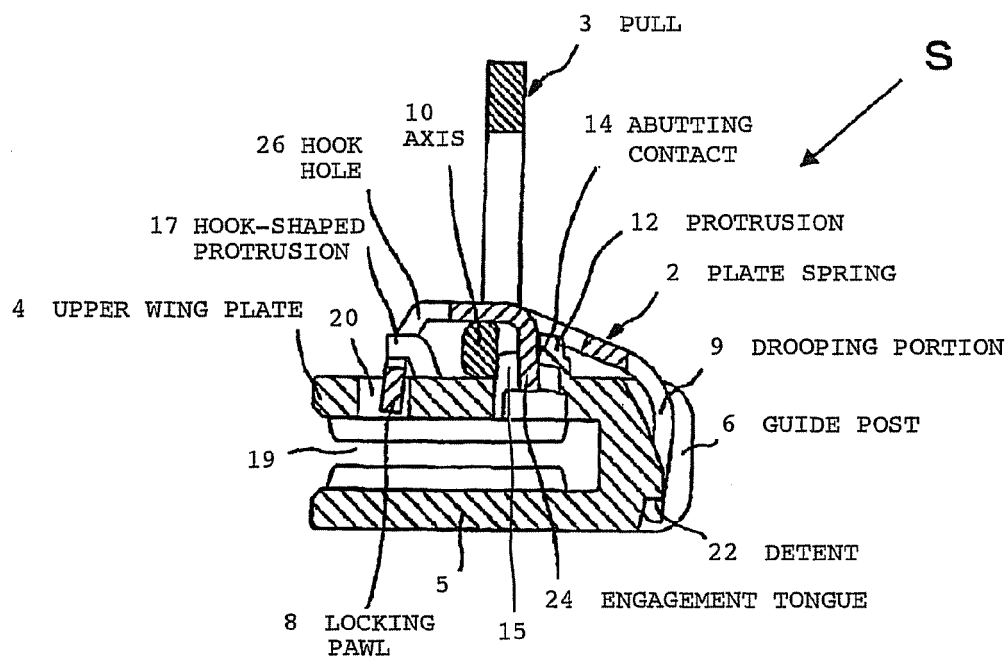


FIG. 5

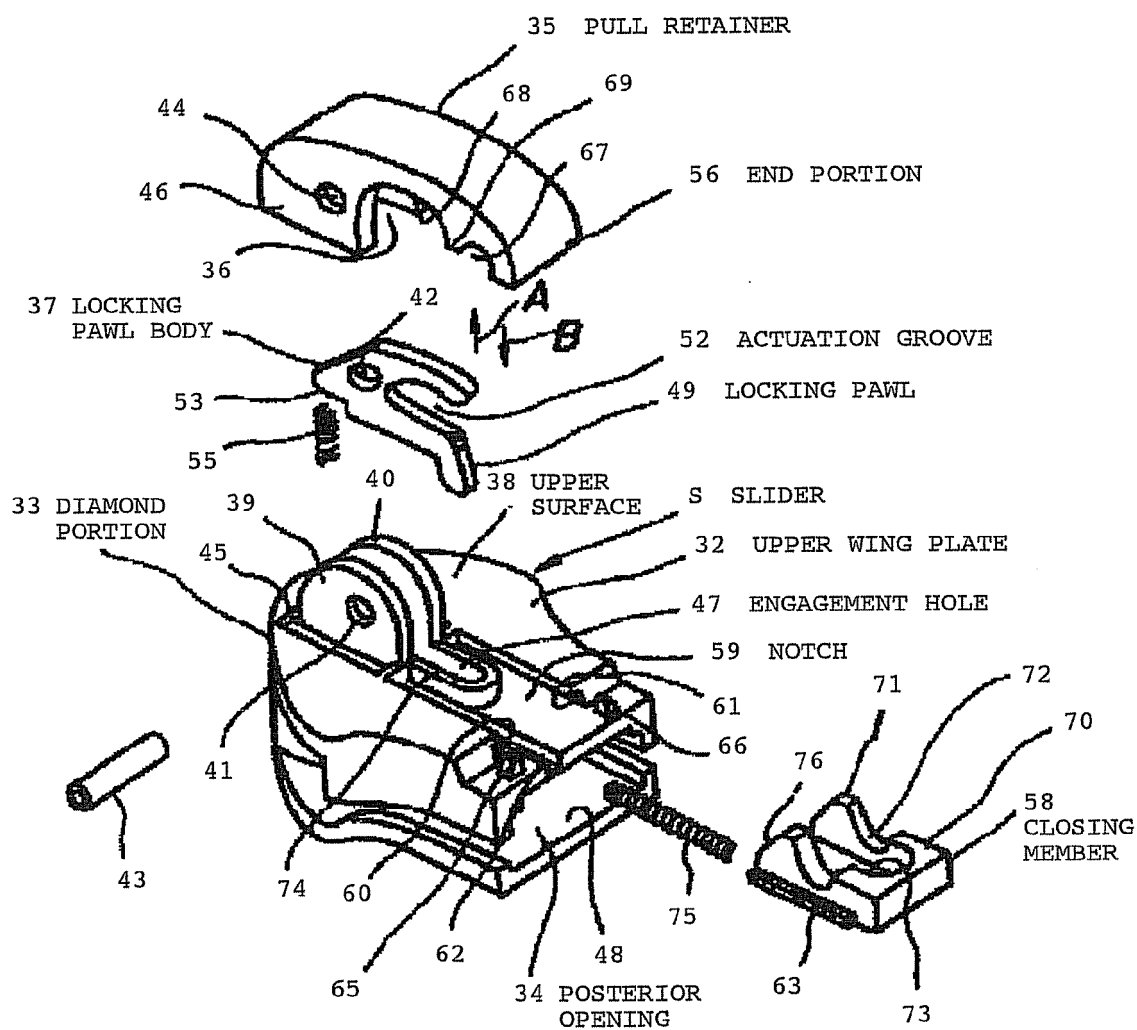


FIG. 6

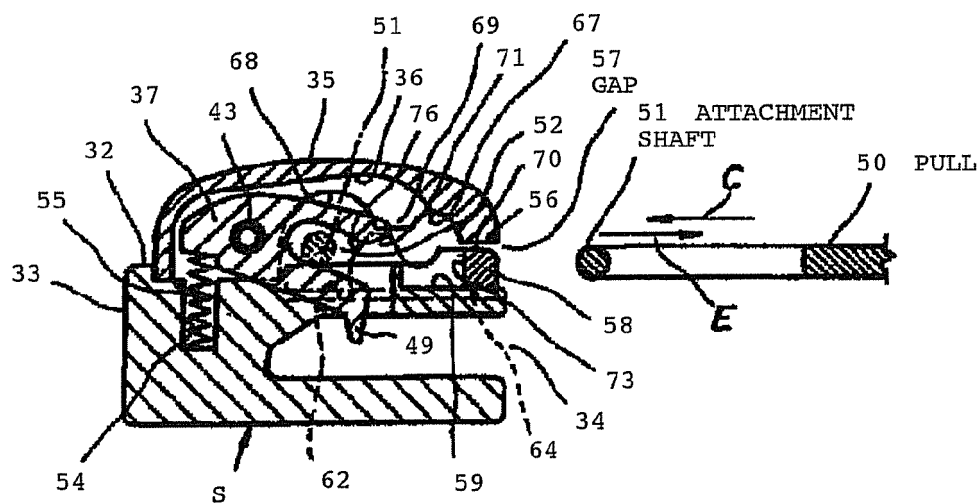


FIG. 7

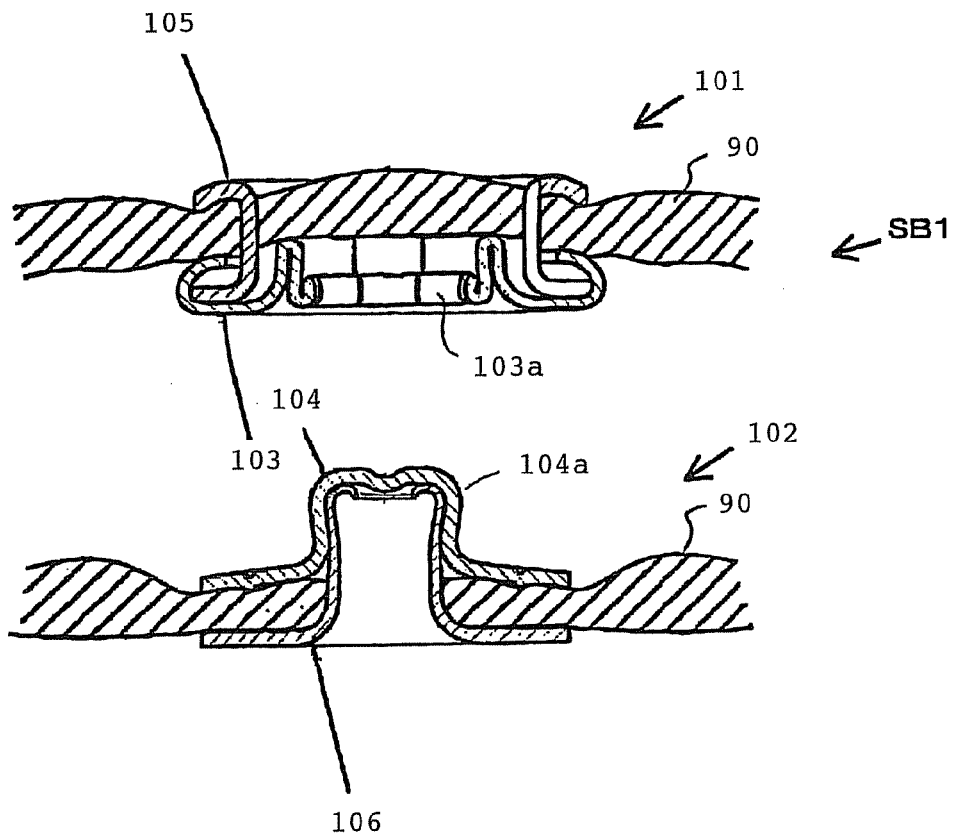
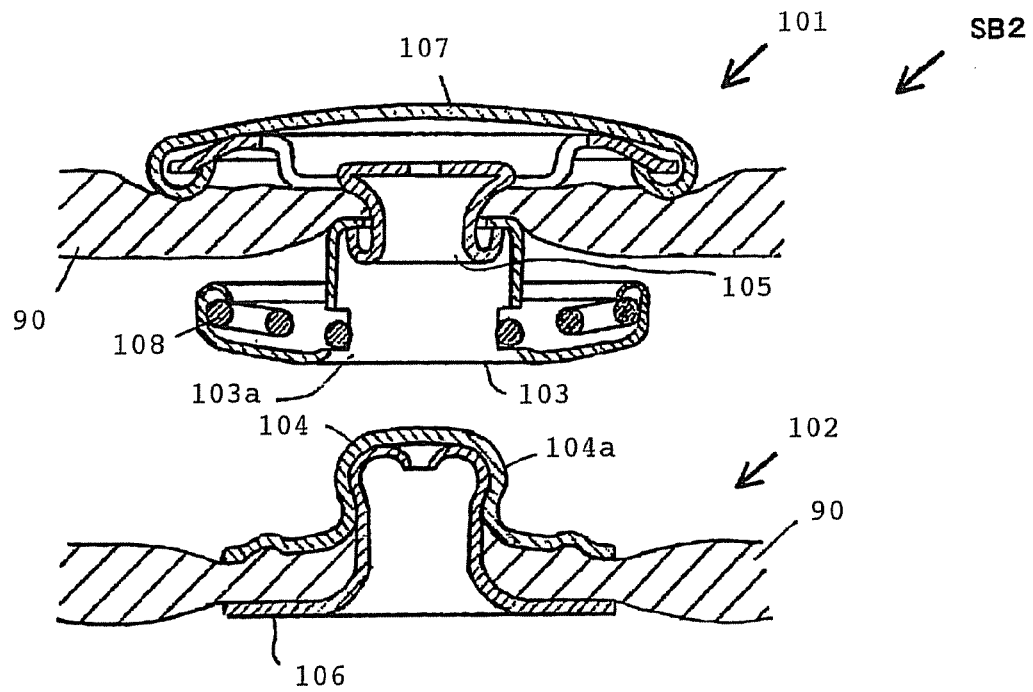


FIG. 8



REFERENCES CITED IN THE DESCRIPTION

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