Feb. 2, 1971 S. KYSER 3,559,515

SELF GRIPPING NEEDLE-NOSE PLIER

Filed Dec. 20, 1967

FIG. 1

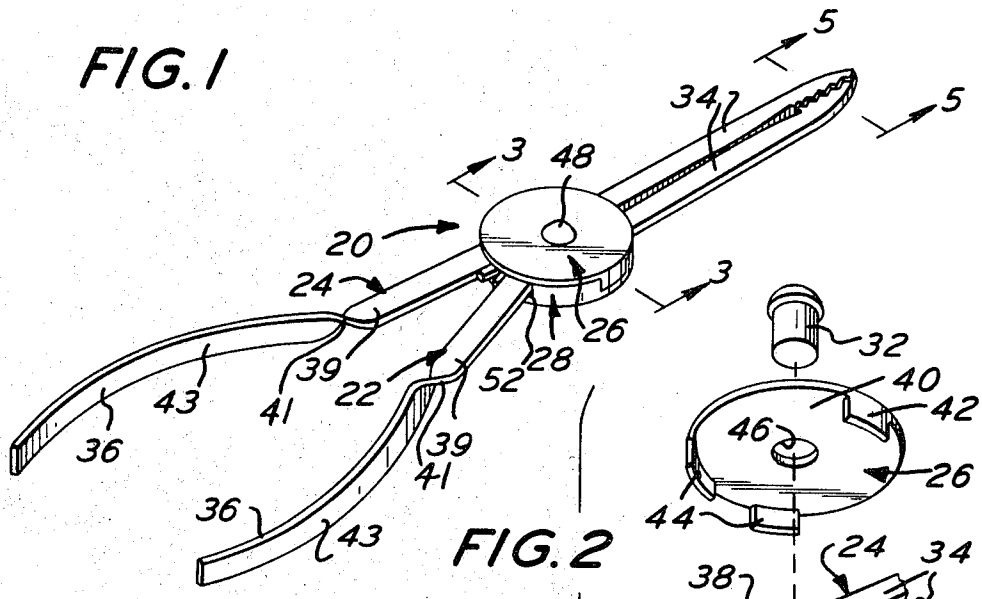


FIG. 2

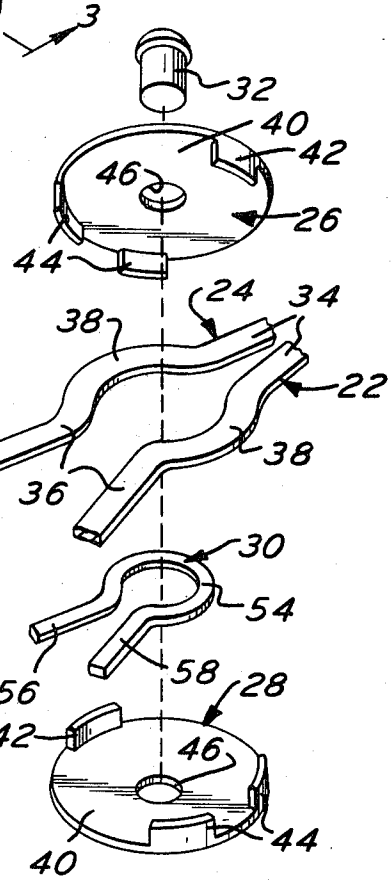


FIG. 3

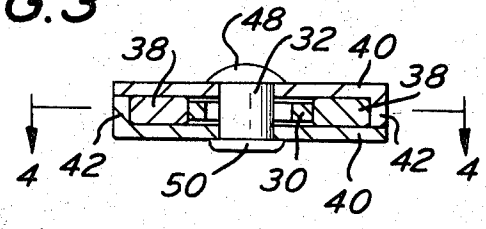
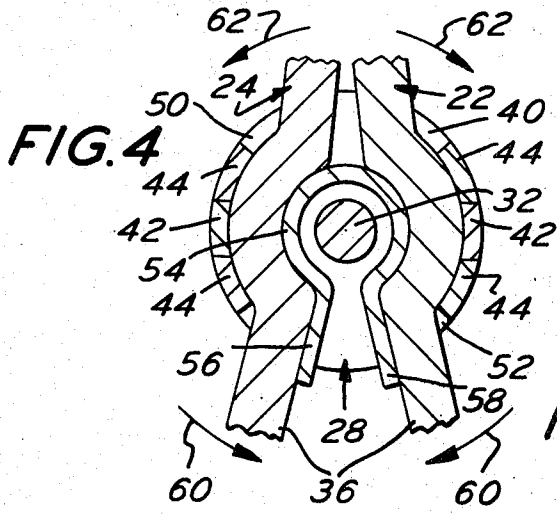


FIG. 4



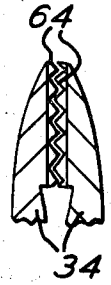
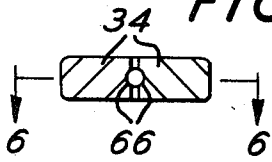


FIG. 6

FIG. 5



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SELF GRIPPING NEEDLE-NOSE PLIER

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U.S. Cl. 81—427 1 Claim

ABSTRACT OF THE DISCLOSURE

A pair of pliers which is formed with a pair of complementary members. Each of the members has a jaw portion, a handle portion and an intermediate arcuate portion which is integral therewith. An arcuate spring is provided between the arcuate portions of the members and is embraced thereby. The spring and complementary members are confined so that movement of the spring and the complementary members is in the same plane with respect to each other. The spring urges the jaws together so that the jaws are spaced only by urging the handles together.

This invention relates generally to pliers and more particularly to self gripping needle-nose pliers.

Needle-nose pliers often have long jaws and handles. In conventional needle-nose pliers, handles are pivoted with respect to each other about a pin which extends through a flattened surface between the jaw and handles of each of the members. Therefore, the only restriction which the jaws and handles have with respect to being maintained in the same plane when pivoted with respect to each other, are the enlarged heads of the pin which secures the handles together. Therefore, if any lateral forces are applied to the jaws, a tool or fastener secured between the jaws of the pliers will become dislodged.

Moreover, since the pin is the only securement between the handles of the pliers, the life of the pliers is shortened by the destruction of the pin due to the shear forces applied thereto by the handles and jaws of the pliers.

It is therefore an object of the invention to overcome the aforementioned disadvantages.

Another object of the invention is to provide a new and improved pair of pliers.

Another object of the invention is to provide a new and improved pair of self-gripping needle-nose pliers.

Another object of the invention is to provide a pair of pliers having a pair of complementary members, the jaws of which are spaced and moved with respect to each other by drawing the handles together rather than pivoting the handles with respect to each other.

Another object of the invention is to provide a new and improved pair of pliers having large restricting means for maintaining the handles and jaws of the pliers in the same plane with respect to each other.

Another object of the invention is to provide a new and improved pair of self gripping pliers which are inexpensive to manufacture, yet which are more reliable than conventional needle-nose pliers.

These and other objects of the invention are achieved by providing a pair of pliers having a pair of complementary members. Each of the members has a jaw portion and a handle portion. The handle and jaw portions are integral with an arcuate portion provided therebetween. An arcuate spring is provided between the arcuate portions of the members and is embraced between these portions. The spring and complementary members are confined to movement in the same plane with respect to each other. The spring urges the jaws together so that the jaws are spaced only by urging the handles together.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a pair of needle-nose pliers per se embodying the invention;

FIG. 2 is a fragmentary exploded perspective view illustrating the various parts of the self gripping needle-nose pliers;

FIG. 3 is an enlarged sectional view taken along the line 3—3 in FIG. 1;

FIG. 4 is a fragmentary sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is an enlarged sectional view taken along the line 5—5 of FIG. 1; and

FIG. 6 is a fragmentary sectional view taken along the line 6—6 in FIG. 5.

Referring now in greater detail to the various figures of the drawing wherein similar reference characters refer to similar parts, a pair of needle-nose pliers is generally shown at 20 in FIG. 1.

As best seen in FIG. 2, needle-nose pliers 20 basically comprise a pair of complementary members 22 and 24, a pair of complementary cap sections 26 and 28, a spring 30 and a fastener 32. The members 22 each comprise an elongated jaw 34, an elongated handle 36 and an integral arcuate intermediate section 38. As best seen in FIGS. 1 and 2, the jaws 34, the arcuate portions 38, and the forwardmost portions 39 of the handles 36 of the members 22 and 24 are substantially planar. The gripping portions of the handles are formed by a 90° twist at 41 which causes the rearmost portions 43 of the handles to face laterally. Portions 43 are arcuately formed to facilitate gripping thereof.

The cap sections 26 and 28 each include a circular planar body portion 40, a single peripheral projection 42 which extends transversely to the plane of said body portion 40 and a pair of projections 44 which are spaced from each other approximately the width of projection 42, but spaced symmetrically about the periphery of the body section 40 diametrically opposed from projection 42.

Each of the caps 26 and 28 include a centrally located circular opening 46 through which fastener 32 extends for securing the caps together. As best seen in FIGS. 3 and 4, fastener 32 includes an enlarged head 48 and an enlarged portion 49 which is formed preferably by swaging.

As best seen in FIG. 4, the cap sections 26 and 28 are alike and are adapted to fit together in a complementary relation. Thus, when cap section 26 and 28 are facing each other and are aligned, the projection 42 of cap section 26 extends between the projections 44 of the cap section 28. Similarly, projection 42 of cap section 28 extends between projections 44 of the cap section 26. Projections 42 and 44 thereby provide peripheral skirts diametrically opposite each other about the periphery of the caps and act to space the body portions 40 of the cap sections 26 and 28. The body portions 40 also have a pair of slotted peripheral openings 50 and 52 formed between the peripheral skirts and extending about the remaining periphery of the cap sections.

As best seen in FIGS. 2, 3 and 4, the cap sections 26 and 28 are secured about spring 30 and complementary members 22 and 24. The spring 30 includes an arcuate portion 54 and a pair of integral radially expending legs 56 and 58. Members 22 and 24 are secured within the cap sections 26 and 28 with the arcuate portions 38 thereof disposed about and substantially embracing the outer periphery of the arcuate portion 54 of spring 30.

It can therefore be seen that the arcuate sections **38** are adapted to rotate with respect to the arcuate portion **54** of the spring. The handles **36** of the complementary members **22** and **24** are thus normally urged apart by the legs **56** and **58** of the spring **30** thereby urging the jaws **34** of the members together. In order to separate the jaws of members **22** and **24**, the handles **36** are urged together in the direction of arrows **60** thereby causing the arcuate portions of the members **22** and **24** to rotate about spring **30** in the same diirection as arrows **60** and thereby drawing the jaws **34** apart in the direction of arrow **62**. The body portions **40** of the cap sections **26** and **28** restrict the movement of the members **22** and **24** and the spring **30** within a single plane with respect to each other. The entire length of arcuate portion **38** of each of the members **22** and **24** is embraced by the body portions **40** of the caps thereby maintaining the handles and jaws within the same plane. The needle-nose pliers embodying the invention are therefore highly resistant to lateral forces causing the jaws to lose their grip.

The forwardmost portion of the jaws **34** is best seen in FIG. 6 Each of the jaws **34** include knurled gripping sections **64** which facilitate a frictional engagement between the jaws and member secured therebetween. It should also be noted that a longitudinally extending arcuate recess **66** is provided in each of the jaws **34** to facilitate the handling of wire and pins by the needle-nose pliers. As best seen in FIG. 6, the recesses **66** are horizontally aligned with respect to each other and form an arcuate opening between the jaws **34**.

It can therefore be seen that the self gripping needle-nose pliers are inexpensively constructed, yet are a precision tool.

The jaws and handles are maintained in a single plane with respect to each other by means of the cap sections **26** and **28** which provide a large planar surface on opposite sides of the members to maintain and restrict the transverse movement of the members with respect to each other. The arcuate sections **38** of the members **22** and **24** are not pivoted with respect to each other, but are rotated about spring **30** to open and close jaws **34**. Therefore, a single pin that pivotably secures the arcuate section together is not required which would fail more quickly than the remaining portions of the pliers.

Fasteners **32** thereby maintains the caps **26** and **28** together and does not provide any pivoting function to the complementary members **22** and **24**. Without pressure being applied to the handles, the jaws **24** are urged together by spring **30**. The jaws **24** extend through peripheral opening **50** which is formed between the cap sections **26** and **28** and handles **36** extend through opening

52 which is diametrically opposed to opening **50**. The jaws and handles can slide only along the length of the opening, and are prevented from moving transversely with respect to each other by the body portions **40** of the cap sections. To release the grip of the jaws, it is necessary only to squeeze together the handles **36** whereby the jaws of the member **22** and **24** separate.

Without further elaboration, the foregoing will so fully illustrate my invention that others may, by applying current or future knowledge, readily adapt the same for use under various conditions of service.

What is claimed is:

1. A pair of pliers comprising a pair of complementary members, each of said members having a jaw portion and a handle portion, the handle and jaw portions being integral with an arcuate portion provided therebetween, an arcuate spring, said arcuate portions of said members embracing the periphery of said spring, said spring and said complementary members being confined to movement in the same plane with respect to each other by a pair of complementary cap sections which are provided about the complementary members, said cap sections including projections which form a peripheral skirt on diametrically opposed sides of the cap sections to maintain the arcuate sections of the members in the cap when said members are rotated, said cap sections being similar and each including a first peripheral projection and a pair of peripheral projections which are spaced from each other about a point disposed diametrically opposite said first projection, said pair being spaced substantially the width of said first projection, said spring urging said jaws together so that said jaws are spaced only by urging the handles together.

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U.S. Cl. X.R.

24—137; 81—43, 416