The present invention relates to improvements in pliers and has reference more particularly to pliers of the self-locking type.

One of the important objects of the present invention is to provide a novel and improved pliers of the character that includes an effective means for moving the coating jaws toward one another with maximum power when the handle and lever associated with the respective jaws are gripped.

A further object is to provide a device of the above mentioned character that, upon closing the jaws together, will result in the same being automatically locked in a closed position, thereby enabling the pliers to retain a firm grip on the article or object after the pressure of the hand has been released.

A still further object is to provide a pair of pliers that will afford greater grasping efficiency, irrespective of the size or thickness of the article held between the jaws.

Another important object is to provide self-locking pliers that can be manufactured at a very low cost, yet be strong and durable.

Other objects and advantages will become apparent from the following description when taken in conjunction with the accompanying drawing.

In the accompanying drawing forming a part of this specification and in which like reference characters designate corresponding parts throughout the several views—

Figure 1 is a top plan view of the self-locking pliers with the jaws illustrated in a closed position;

Figure 2 is a bottom plan view thereof;

Figure 3 is a side elevation, partly in section;

Figure 4 is a fragmentary top plan view showing the jaws in their open position;

Figure 5 is a transverse section taken approximately on the line 5—5 of Figure 1;

Figure 6 is a transverse section taken approximately on the line 6—6 of Figure 1;

Figure 7 is a detail plan view of the fixed jaw and its handle;

Figure 8 is a detail plan view of the movable jaw and;

Figure 9 is a detail plan view of the actuating lever associated with the movable jaw.

In the drawing, the numeral 1 designates generally my improved self-locking pliers, the same comprising a fixed jaw 2 having an enlarged rear portion 3 from which extends the handle 4. An arcuate slot 5 is formed at one side of the enlarged portion 3, as clearly shown in Figures 5 and 7 and the purpose thereof will be presently described.

This enlarged portion 3 is also formed with a transverse hole 6.

Adapted to coact with the fixed jaw 2 is the movable jaw 7. If desired, the inner opposed faces of the two jaws may be serrated and notched in the conventional manner for better gripping an object.

The movable jaw 7 is formed with an enlarged rear portion 8 which is adapted to overlie the enlarged rear portion 3 of the fixed jaw 2. An enlarged circular opening 9 is formed centrally in the enlarged portion 8 as is clearly illustrated in Figure 8. The enlarged portion 8 is also formed with a transverse hole 10 that registers with the arcuate slot 5.

Forming a salient part of the present invention is the circular disc 11 that is adapted to fit within the circular recess 9 of the enlarged portion of the movable jaw 7 for movement therein. This disc is of substantially the same thickness as the thickness of the enlarged portion 8. A transverse hole is formed in the disc 11 near the outer edge thereof.

A lever 12 having a cam shaped head 13 formed at its forward end also forms an important feature of my self-locking pliers. A stud 14 eccentrically connects the head with the circular disc 11, the head being disposed across the top face of the disc 11. A hole 15 is formed through the head 13 for cooperation with the hole 12 formed in the disc 11 and also with the hole 6 formed in the enlarged portion 3. A bolt 16 extends through these three registering holes and a nut 17 is threaded on the lower end of this bolt, thereby operatively connecting the jaws, circular disc and actuating lever together.

A bolt 18 extends through the registering slot 5 and hole 10 and a nut 19 is threaded on the lower end of this bolt 18. The head of the bolt 18 engages with the top face of the enlarged portion of the movable jaw 7 while the nut 19 engages against the bottom face of the enlarged portion of the fixed jaw 2.

The handle 4 and the coating jaw 2 are preferably curved in opposite directions.

The operation of the self-locking pliers may be briefly stated as follows: The lever 12 is swung away from the handle 4 to the position shown in Figure 4. In this position the jaws are separated to their fullest open position. The jaws are then engaged around an object to be turned or held and in the present instance, I have illustrated the pliers as holding a nut although any other object or article may be gripped.

The lever 12 is then swung toward the handle.
4. This movement causes the bolt 18 to move in the arcuate slot 5 and at the same time the movable jaw 7 is brought close to the fixed jaw 2. Simultaneously, the cam shaped head 13 and the circular disc 11 connected thereto sets up a camming action by means of the connecting bolt 18 and the manner in which the latter connects the head, disc and enlarged portion of the fixed jaw together, locks the jaws around the object held between the latter, even after the pressure on the handle and lever has been released.

In this manner the self-locking pliers can be employed to firmly grip an object without the necessity of having to hold the pliers after the same have once been applied and locked in position and in order to release the pliers it is only necessary to swing the lever away from the handle.

A device of this character can be employed in various places, and particularly where the hand is inaccessible. Further, the pliers can be used to grip various shaped articles from the thickness of a sheet of paper to the full width of the space between the jaws when the latter are in their fullest open position.

A pair of pliers of the above mentioned character will at all times be positive and efficient in its operation and will afford greater grasping efficiency than can be had with the type of pliers now generally in use.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention and the scope of the appended claims.

Having thus described the invention, what I claim is:

1. In self-locking pliers, a fixed jaw and handle, a movable jaw mounted for pivotal movement on the fixed jaw, said movable jaw having a recess formed in its rear portion, a disc mounted for rotation entirely in said recess, an actuating lever having an enlarged head formed on its forward end connected to said disc eccentrically, and means for securing the enlarged head of the lever, disc and fixed jaw together whereby the jaws will be held in a locked closed position when the lever is moved toward the handle.

2. In self-locking pliers, a fixed jaw having an enlarged rear portion, a handle extending from said enlarged portion, a movable jaw having an enlarged rear portion overlying the enlarged rear portion of the fixed jaw and mounted for pivotal movement thereon, the enlarged rear portion of the movable jaw being provided with an enlarged recess, a disc mounted for rotation entirely in said recess, an actuating lever having an enlarged head formed on its forward end, said enlarged head overlying the top face of the disc and being eccentrically connected thereto, and means for operatively securing the enlarged head of the lever, disc and enlarged portion of the fixed jaw together whereby the jaws will be locked in a closed position when the lever is moved toward the handle.

3. In self-locking pliers, a fixed jaw having an enlarged rear portion, a handle extending rearwardly therefrom, a movable jaw having an enlarged rear portion overlying the enlarged rear portion of the fixed jaw and mounted for pivotal movement thereon, the enlarged portion of the movable jaw having an enlarged recess formed therein, a disc mounted for rotation within said recess, an actuating lever, an enlarged head formed on the forward end of said lever, said head overlying the enlarged rear portion of the movable jaw and disc and being eccentrically secured to said disc, and an element extending through the head of the lever, disc and enlarged portion of the fixed jaw whereby the jaws will be locked in a closed position when the actuating lever is moved toward the handle.

4. In self-locking pliers, a fixed jaw having an enlarged rear portion, a handle extending rearwardly therefrom, a movable jaw having an enlarged rear portion overlying the enlarged rear portion of the fixed jaw and mounted for pivotal movement thereon, the enlarged portion of the fixed jaw having an arcuate slot, a pivot element extending through the enlarged portion of the movable jaw and through the arcuate slot, the enlarged portion of the movable jaw having an enlarged recess formed therein, a disc mounted for rotation within said recess, an actuating lever, an enlarged head formed on the forward end of said lever, said head overlying the enlarged rear portion of the movable jaw and disc and being eccentrically secured to said disc, and an element extending through the head of the lever, disc and enlarged portion of the fixed jaw whereby the jaws will be locked in a closed position when the actuating lever is moved toward the handle.

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