

Jan. 24, 1933.

R. G. DRIPPS

1,895,314

PLIERS

Filed July 10, 1931

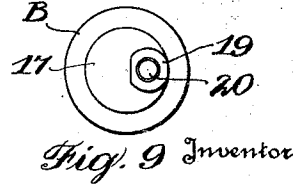
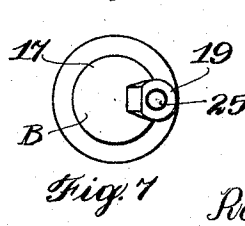
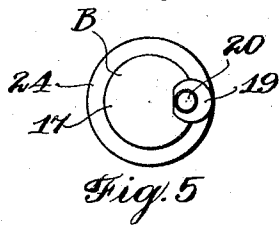
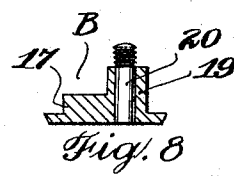
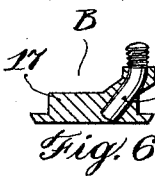
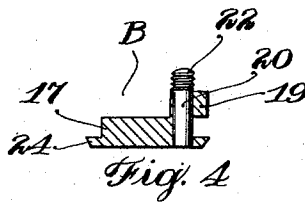
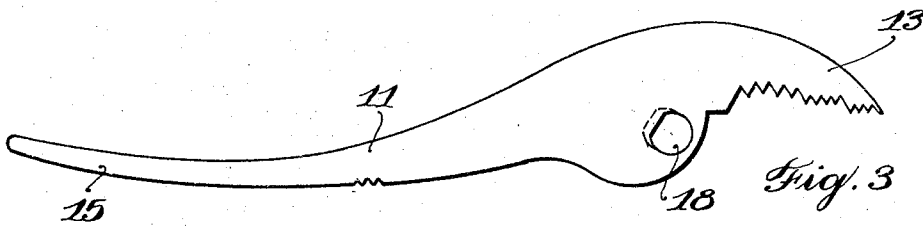
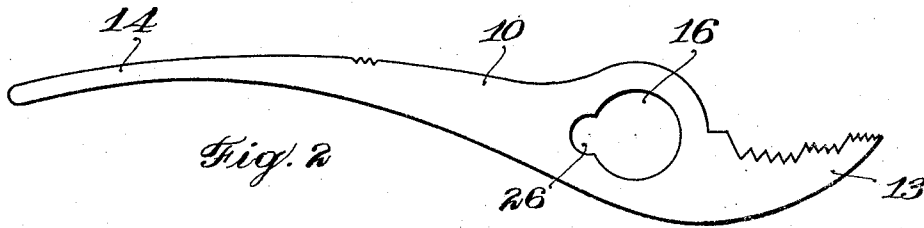
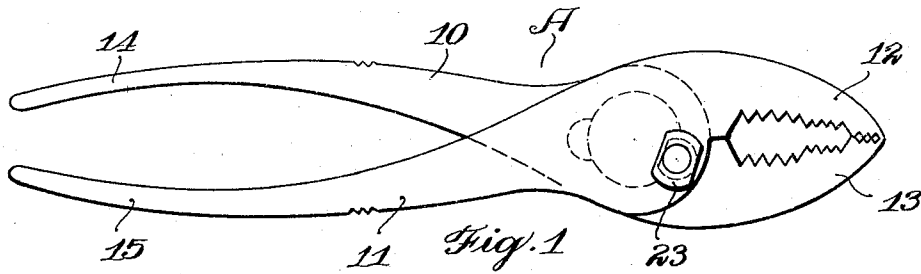


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PLIERS

Application filed July 10, 1931. Serial No. 549,851.

My invention relates to an improvement in pliers, characterized by a novel connecting means between the crossed levers whereby these members are connected at different axial points from each other to permit the jaws to operate, and whereby the strain is centered at a point nearer the jaws, to provide a high leverage.

It is my object to form the handle or lever connecting means comprising a flanged cylindrical pivot adapted to act as a bearing upon which one of the crossed levers may rotate as the jaws are opened and closed, and a fulcrum pin projecting from the face of the pivot, and adapted to extend through an aperture formed in the second crossed handle or lever member. The fulcrum pin is irregularly shaped, or otherwise connected to the second handle member against turning, and is provided with a threaded end to receive a nut adapted to hold the two handle members together. The fulcrum pin is offset from the center of the pivot, and in preferred form the center of the fulcrum is offset from the center of the pivot a distance equal to the radius of the pivot. The manufacture of such a connecting means necessitates a novel form of construction of handle or lever members.

The invention includes a pliers formed with one of the levers which carries the jaw on the end thereof with an enlarged pivot work opening for receiving the connecting stud which holds the levers together and in forming the other lever which carries the other jaw with a stud receiving opening which is off center of the axis of the opening in the first lever to provide a pliers or gripping member formed of levers connected together so that a greater gripping force is provided to the co-operating jaws.

It is a feature of my invention that the apertures through the handle members are so placed as to position the center of the fulcrum at a point interposed between the center of the pivot and the jaws of the handle members. Accordingly, while the pivoting of the jaws takes place at a point relatively far from the jaws to permit the jaws to open widely when the handles are spread,

the offset fulcrum in the connecting member causes the strain of pinching an object between the jaws to be centered somewhat nearer the jaws, increasing the leverage.

It is a feature of my invention to include the particular method of making a connector in a manner to strengthen the same by means of a stud which is cast or embedded within the connecting member. This stud extends into the cylindrical pivot and the fulcrum pin, and projects from the end of the pin to form the threaded portion for the retaining nut. This stud may be embedded within the pivot with its circumference lying in the circumference of the pivot, and may extend through the fulcrum at one side of the center thereof, to permit the fulcrum to be centered at the circumference of the pivot. The stud may also be bent in a manner to provide sufficient offset between the fulcrum and the pivot centers. A notch is formed adjacent the circular aperture for accommodation of the pivot, to permit the connecting means to be inserted in place.

These features combine to form a pliers which acts to hold an object between the jaws more tightly than has been possible heretofore without sacrificing the adjustability of the jaws. While the jaws of my pliers may be spread to grasp a large object without spreading the handles too far apart to be held in the hand, high leverage is obtained by the offset fulcrum.

Other features, together with the details of construction of my pliers, will be more clearly and fully set forth in the following specification and claims.

In the drawing forming a part of this specification:

Figure 1 is a plan view of my pliers.

Figure 2 is a plan view of one of the handle members of my pliers.

Figure 3 is a plan view of the other handle member of my pliers.

Figure 4 is a cross section through the handle connecting means.

Figure 5 is a plan view of the handle connecting means illustrated in Figure 4.

Figure 6 is a cross section through an alternate form of handle connecting means.

Figure 7 is a plan view of the connecting means shown in Figure 6.

Figure 8 illustrates another modification of handle connecting means.

Figure 9 is a plan view of the connecting means shown in Figure 8.

My pliers A are formed with crossed handles 10 and 11 extending into opposed jaws 12 and 13. The handle members 10 and 11 are similar to the ordinary type of plier handle members and are flat adjacent the point of connection therebetween, extending into broad flat hand engaging ends 14 and 15.

One handle member 10 is provided with a circular aperture 16. This aperture 16 is for accommodation of the cylindrical pivot 17 of the connecting means B, which fits freely therein and permits the handle member 10 to be rotated about the portion 17 of the connecting means B.

The handle member 11 is provided with a small aperture 18 which is preferably irregular in outline and which is centered considerably nearer the jaws 12 and 13 than is the aperture 16. The aperture 18 is formed for accommodation of the fulcrum portion 19 of the connector B and is irregular in shape as is the fulcrum portion 19 so that the fulcrum will not turn with relation to the handle member 11. Accordingly, as the handle members 10 and 11 are spread apart or pivoted together the connecting means B remains motionless with reference to the handle member 11, and the handle 10 merely pivots on the pivot 17.

In order to strengthen the fulcrum 19, I provide a stud 20 which is cast or molded directly into the connecting means B. The stud 20 is preferably formed with its circumference lying in the circumference of the cylindrical pivot 17, extending through the fulcrum 19 to project somewhat beyond the same. The stud 20 may pass through the fulcrum 19 at one side thereof as illustrated in Figure 4, so that the center of the fulcrum 19 is offset from the center of the pivot 17 a distance equal to or somewhat exceeding the radius of the cylindrical pivot. The projecting end 22 of the pivot 20 is threaded to accommodate a retaining nut 23 acting to hold the jaws 10 and 11 together. A flange 24 is formed on the connecting means B adjacent the cylindrical pivot 17 to hold the handle member 10 in place.

If it is desired the connecting means B may be formed as illustrated in Figure 6. In this modification a curved stud 25 is embedded within the connecting means so that this stud 25 may be positioned centrally within the fulcrum 19. This type of construction makes a great strain necessary to twist the fulcrum 19 from the circular pivot 17.

The modification illustrated in Figure 8 is very similar to that illustrated in Figure 4 with the exception that the stud 20 is centered somewhat within the diameter of the cylin-

drical pivot 17. It may be seen, however, that in this type of construction, the degree of offset is increased appreciably.

As the fulcrum 19 extends beyond the diameter of the cylindrical pivot 17, I provide a notch 26 adjacent the side of the aperture 16 opposite the jaw 13. The connecting means B may then be inserted in place by projecting the fulcrum 19 through the notch 26. This structure obviates the necessity of providing a removable flange 24 on the pivot 17.

In operation, when the handle members 10 and 11 are spread apart at the handle ends, the circular pivot 17 is centered sufficiently far from the jaws to permit the same to open widely. However, when an object is being grasped by the jaws 12 and 13, the handles 10 and 11 cease to pivot and the pliers remain in a static condition. Force exerted at the ends 14 and 15 of the handles 10 and 11 is exerted against the object being grasped by the jaws 12 and 13. However, the center of the pivot 17 is the fulcrum of the force exerted upon the handle 10 whereas the center of the offset fulcrum 19 is the fulcrum of the force exerted upon the handle member 11. As the forces on the two handle members are thus not directly opposed on the connecting means B, a resilient force between the center of the pivot and the center of the fulcrum results in a couple force tending to twist the fulcrum 19 from the pivot 17. The leverage of the handle members 10 and 11 is thus centered between the center of the fulcrum 19 and the center of the pivot 17. The center of leverage is accordingly closer to the jaws than is the pivot point and thus an increased leverage is obtained.

In accordance with the patent statutes I have described the principles of operation of my pliers, and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that this is only a means of carrying out my invention and that obvious changes may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:

1. A pliers including, a pair of levers, an enlarged pivot work opening formed in one of said levers, a small stud receiving opening formed in the other of said levers, and a connector having a working surface to fit into said first enlarged opening in said first lever, and an offset stud having a threaded end for receiving a nut adapted to project through said small opening in said second lever, said offset stud being positioned to extend with its axis lying in the working surface of said connector which operates in said enlarged opening in said first lever.

2. A pliers including, a pair of levers, working jaws formed on one end of said levers, operating handles formed on the other

end, a connector for holding said levers together including a cylindrical working surface adapted to engage in a similar surface in one of said levers, an annular flange adjacent said working surface on said connector, an offset stud projecting from the side opposite said flange of said connector, a threaded end formed on said stud, a nut for engaging the same, said stud having an angular nature and adapted to fit into a similar angular opening formed in the other of said levers of said pliers, to rigidly secure said stud in said last lever while the other lever pivots on said cylindrical working surface, the axis of said stud being positioned in line with the periphery of said working surface on said connector for the lever mounted thereon.

3. A pliers including, a pair of levers having working jaws on one end and handle members on the other, and a connector adapted to hold said levers in working position with a pivoting point on one lever and an attaching point on the other lever, the axis of the pivot and attaching points being offset to a degree whereby the attaching point is closer to the working jaws than the axis of the pivoting point, and the axis of the attaching point being positioned in line with the periphery of the working surface of the pivot point of said levers.

4. A pliers including, a pair of crossed levers, a connector pivotally extending through one of said levers with an enlarged cylindrical working surface, a stud projecting from the body of said connector offset beyond the periphery of said working surface and adapted to be fixed in one of said levers, while the working surface of the connector acts as an enlarged pivot for the other of said levers.

5. A connector for a pair of crossed plier levers including, an enlarged cylindrical working surface, an annular flange on one side thereof, a flat inner bearing surface adapted to form a shoulder to engage against one of the levers of said pliers, an enlarged working surface formed in one of the levers to engage the working surface of said connector adjacent said flange, an anchoring stud projecting from said flat inner surface of said connector, and positioned beyond the working surface to provide an offset connecting portion for said connector with one of the levers, a threaded end formed on said stud, a nut for engaging said threaded end to attach said connector to one of the levers of said pliers, while the other lever freely rotates on said cylindrical working surface.

6. A connector for a pair of plier levers including, a body portion, a cylindrical working surface for one lever having an annular flange thereabout, a flat inner shoulder surface adjacent said working surface, an offset attaching stud for the other lever of the pliers adapted to position the attaching stud nearer

the working jaws of the pliers than the operating axis of the other jaw on said working surface, and a reinforcing member extending from the body of said connector and through said stud to reinforce the same and having a threaded nut receiving end formed thereon.

7. A connector for a pair of crossed plier levers including, a body portion, a stud projecting from said body portion, and a reinforcing member extending from said body portion and through said stud to reinforce the same in the forming of said connector.

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