

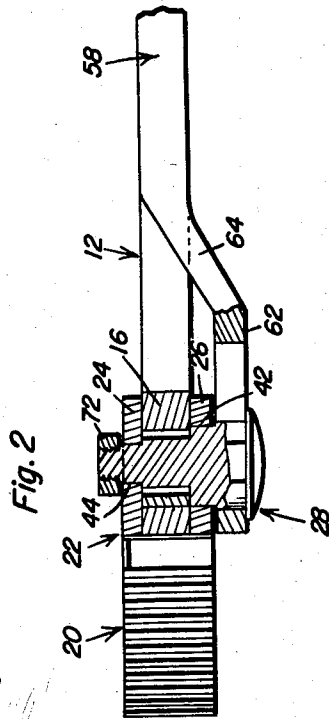
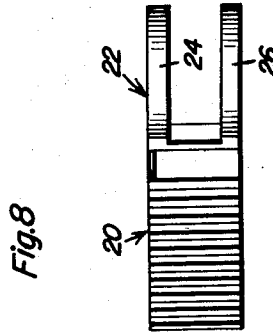
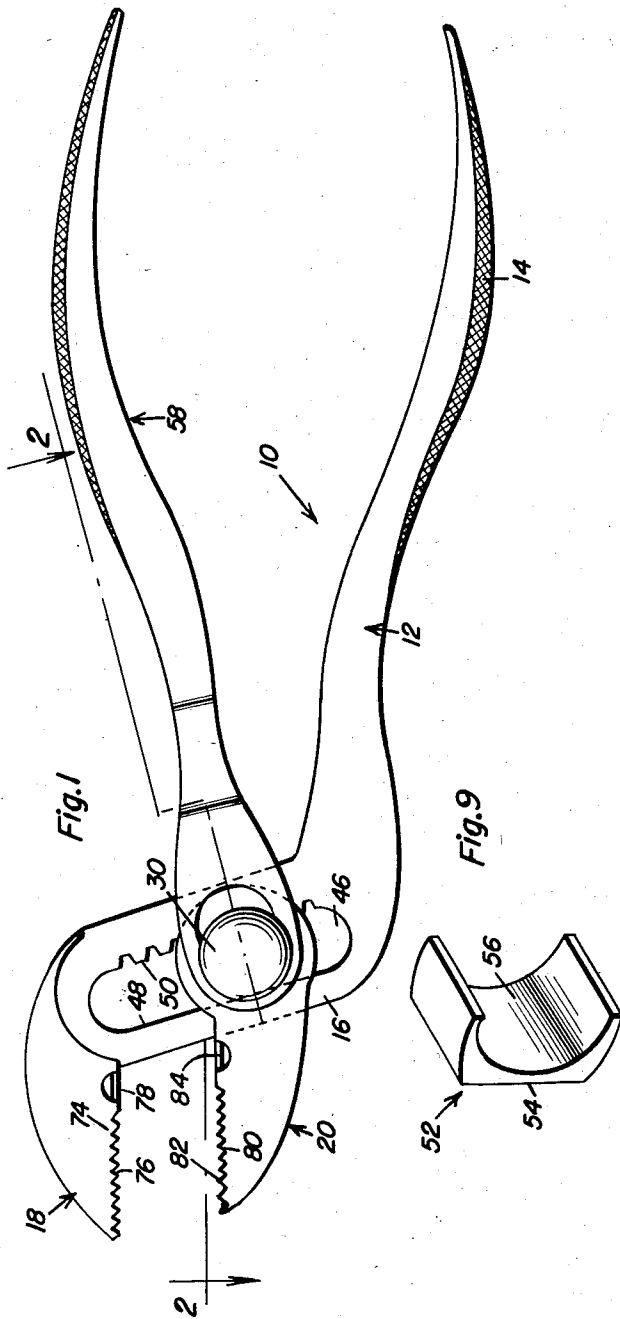
July 22, 1958

J. M. HENDRICKSON
ADJUSTABLE JAW PLIERS

2,844,061

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2 Sheets-Sheet 1



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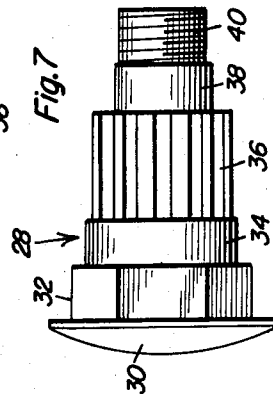
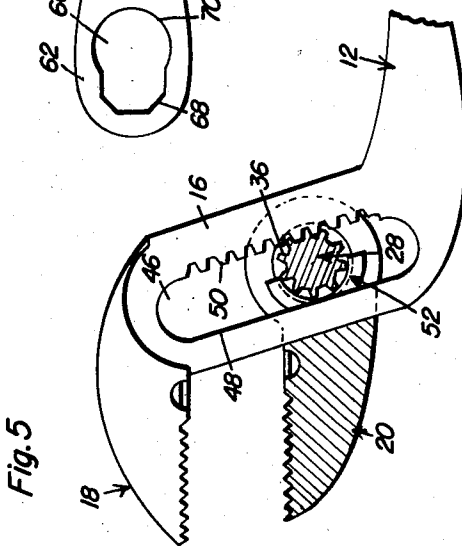
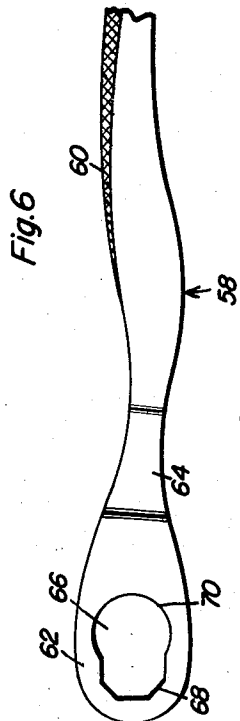
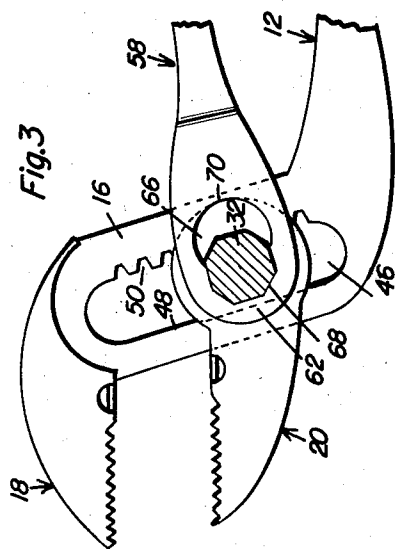
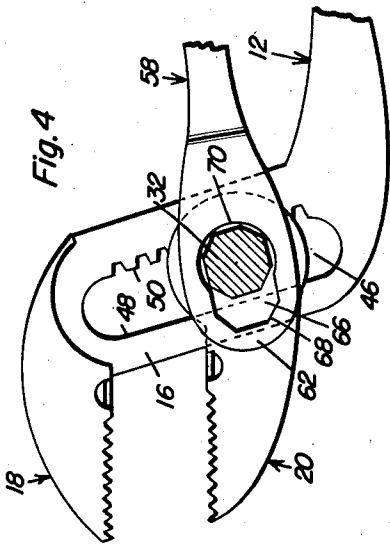
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2 Sheets-Sheet 2



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2,844,061

ADJUSTABLE JAW PLIERS

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7 Claims. (Cl. 81—356)

This invention relates in general to new and useful improvements in hand tools, and more specifically to adjustable jaw pliers.

In order to obtain the maximum grip on an article, it is desirable that at the time of gripping the jaws of pliers be disposed in parallel relation. However, with ordinary pliers where the jaws are integrally connected to the handles and the handles are pivotally mounted with respect to each other, this does not occur except in one position of the pliers. Also, there are devised special types of pliers whereby the pivot point between the two handles may be varied so as to selectively vary the initial positions of the jaws. However, while such pliers are more practical than ordinary pliers, the optimum relationship between the jaws cannot be obtained and the handles cannot be disposed in the optimum gripping positions when the jaws are engaged with the article to be gripped.

It is therefore the primary object of this invention to provide improved pliers wherein there are provided a fixed jaw and a movable jaw, the movable jaw being so mounted whereby it is disposed in parallel relation to the fixed jaw at all times and there is provided suitable drive means for moving the movable jaw towards and away from the fixed jaw to effect a clamping or a releasing action as is desired.

Another object of this invention is to provide an improved pliers which includes a movable jaw and a fixed jaw, the movable jaw including suitable drive means for positioning it relative to the fixed jaw, and there being provided a first handle connected to the fixed jaw and a second handle connected to the movable jaw, the position of the second handle with respect to the movable jaw being variable whereby the second handle may be disposed in an optimum gripping position at such time as the jaws engage the article to be grasped by the pliers.

A further object of this invention is to provide an improved plier construction which includes a first handle having an offset portion at one end thereof to which there is integrally connected a projecting fixed jaw, the offset portion having a slot extending the length thereof, the slot having projecting thereinto a rack which is engaged by a pinion, the pinion being part of a drive pin which is carried by the movable jaw whereby as the drive pin is rotated the movable jaw is moved relative to the fixed jaw, and there being provided a second handle for selectively rotating the drive pin to position the movable jaw relative to the fixed jaw.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a plan view of the pliers which are the subject of this invention and shows the second handle thereof in a drive pin driving position;

Figure 2 is a fragmentary longitudinal sectional view

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taken substantially upon the plane indicated by the section line 2—2 of Figure 1 and shows the details of the movable jaw, the drive pin and the second handle;

Figure 3 is a fragmentary plan view of the jaw end of the pliers with the head of the drive pin broken away and the drive pin shown in section in order to illustrate the drive connection between the second handle and the drive pin;

Figure 4 is a view similar to Figure 3 and shows the second handle shifted with respect to the drive pin so as to be in a position for rotation relative to the drive pin;

Figure 5 is an enlarged plan view with a portion of the movable jaw and drive pin being broken away and shown in section in order to illustrate the specific relationship between the drive pin and the rack of the offset portion of the first handle;

Figure 6 is a plan view of the second handle removed from the remainder of the pliers;

Figure 7 is an enlarged elevational view of the drive pin and shows the specific details thereof;

Figure 8 is an elevational view of the movable jaw removed from the remainder of the pliers; and

Figure 9 is an enlarged perspective view of a bushing for the drive pin.

Referring now to the drawings in detail, it will be seen that the pliers, which are the subject of this invention, are referred to in general by the reference numeral 10. The pliers 10 includes a first handle 12 which is provided at one end with a grip portion 14. It is to be noted that the grip portion 14 is configured to comfortably be received in one's hand. Formed integral with the first handle 12 at the end thereof remote from the grip portion 14 is an offset portion 16. The offset portion 16 is flat and of a rectangular cross section, as is best shown in Figure 2. Formed integral with the offset portion 16 at the end thereof remote from the first handle 12 is a fixed jaw 18. The fixed jaw 18 is of a greater thickness than the offset portion 16 and projects therefrom in a direction opposite from the first handle 12.

The pliers 10 also includes a movable jaw 20. The movable jaw 20 includes a bifurcated portion 22 which is formed by a pair of flanges 24 and 26. The flanges 24 and 26 are spaced apart a distance equal to the thickness of the offset portion 16 so that the movable jaw is slidably mounted on the offset portion 16. Movement of the movable jaw 20 with respect to the fixed jaw 18 is restricted to back and forth movement by the engagement of the bifurcated portion 22 with the offset portion 16, pivoting of the movable jaw 20 relative to the offset portion 16 being prevented.

Illustrated in Figure 7 is a drive pin which is referred to in general by the reference numeral 28. The drive pin 28 includes an enlarged head 30. Disposed next to the head 30 is a polygonal portion 32. Disposed adjacent the polygonal portion 32 is an enlarged bearing portion 34. Next there is provided a pinion 36. Following the pinion 36 is a second bearing portion 38. The drive pin 28 terminates in an externally threaded end portion 40. It is to be understood that all of the portions of the drive pin 28 reduce in size downwardly from the head 30 to the externally threaded end portion 40.

The drive pin 28 is carried by the bifurcated portion 22 of the movable jaw 20. It is to be noted that the flange 26 is provided with an enlarged bore 42 which receives the bearing portion 34 of the drive pin 28. Also, the flange 24 is provided with a small bore 44 which receives the bearing portion 38.

As is best shown in Figure 5, the offset portion 16 is provided with an elongated slot 46 which extends between

the first handle and the fixed jaw 18. The slot 46 includes a flat wall portion 48 which has disposed opposite thereto a rack 50.

The drive pin 28 passes through the slot 46 and has the pinion 36 thereof meshed with the rack 50. The drive pin 28 is rotatably journaled within the slot 46 and retained in meshing engagement with the rack 50 by means of a bushing which is referred to in general by the reference numeral 52.

As is best shown in Figure 9, the bushing 52 includes a flat wall portion 54 which is disposed in sliding engagement with the flat wall portion 48. Also, the bushing 52 includes a semi-circular wall portion 56 which is engaged by the pinion 36 and which guides the pinion 36 in its rotation within the slot 46.

The pliers 10 also includes a second handle which is referred to in general by the reference numeral 58. The second handle 58 includes a hand grip portion 60 at one end thereof and an enlarged head 62 at the opposite end thereof. The hand grip portion 60 is connected to the enlarged head 62 by an offset intermediate portion 64 so that the hand grip portion 60 may lie in a common plane with the hand grip portion 14 of the first handle 12.

The head 62 is provided with an elongated opening 66 which has an axis extending longitudinally of the second handle 58. The opening 66 is boundried by a first wall portion 68 which is polygonal in outline. The remaining portion of the opening 66 is boundried by a generally semi-circular wall 70. The polygonal wall portion 68 conforms in outline and size to the polygonal portion 32 of the drive pin 28 so that the second handle 58 may be locked with respect to the drive pin 28. On the other hand, that portion of the opening 66 boundried by the semi-circular wall portion 70 is of a size to permit relative turning between the second handle 58 and the drive pin 28.

It is to be noted from Figure 2 that the pliers 10 are assembled by first placing the movable jaw 20 on the offset portion 16. Then the bushing 52 is positioned in the slot 46. The drive pin 28 is first passed through the head 62 of the second handle 58 and then is passed through the bifurcated portion 22 of the movable jaw 20 and the offset portion 16. The drive pin 28 is retained in place by a nut 72 which is threadedly engaged on the externally threaded end portion 40.

The fixed jaw 18 is provided with a jaw face 74 which includes a serrated portion 76 and a cutter portion 78.

The movable jaw 20 includes a jaw face 80 which is disposed in opposed relation to the jaw face 74. Also, the jaw face 80 is disposed in parallel relation with respect to the jaw face 74. The jaw face 80 includes a serrated portion 82 and a cutter portion 84 which cooperate with the serrated portion 76 and the cutter portion 78, respectively, of the jaw face 74.

From the foregoing description of the components of the pliers 10, it will be readily apparent that when the second handle 58 is interlocked with the drive pin 28, when the handle 58 is moved relative to the handle 12, the drive pin 28 will be rotated and thus fed along the slot 46 either towards the fixed jaw 18 or away therefrom depending upon the direction of rotation. Also, it will be readily apparent that by shifting the second handle 58 from the position illustrated in Figures 1 and 3 to the position illustrated in Figure 4, the second handle 58 may be freely rotated with respect to the drive pin 28 so as to permit repositioning of the second handle 58 relative to the first handle 12 for a final gripping action.

In the normal operation of the pliers 10, the handle 58 is manipulated so as to rotate the drive pin 28 and move the movable jaw 20 towards the fixed jaw 18 so that the two jaws 18 and 20 grip opposite surfaces of an article to be gripped. Then the second handle 58 is slid to the position illustrated in Figure 4 and moved relative to the first handle 12 to a comfortable gripping position. The second handle 58 is then again returned to its posi-

tion of Figures 1 and 3 after which it is finally gripped to obtain the final grip on the article to be gripped by the pliers 10. It will thus be apparent that the pliers 10 are capable of providing a firm grip on an article desired to be gripped when the handles 12 and 58 thereof are in optimum gripping positions. It is also readily apparent that the jaws 18 and 20 of the pliers 10 remain parallel at all times so as to provide a maximum gripping action, as is desired. It will also be readily apparent that despite all of the advantageous features of the pliers 10, the construction thereof remains extremely simple, the pliers containing only one more main part than conventional type pliers.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An improved tool of the pliers type comprising a first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive pin is rotated, said drive pin and said movable jaw are moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin.

2. An improved tool of the pliers type comprising a first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive pin is rotated, said drive pin and said movable jaw are moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin, said drive pin including an upper polygonal portion, said second handle having an elongated opening receiving said polygonal portion, said opening having a polygonal wall portion corresponding to said polygonal portion for interlocking said second handle with said drive pin and semi-circular wall portion for permitting relative rotation of said second handle with respect to said drive pin.

3. An improved tool of the pliers type comprising a first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive

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pin is rotated, said drive pin and said movable jaw are moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin, said slot having a flat wall portion opposing said rack, a bushing disposed in said slot and slidably engaged with said flat wall portion, said bushing engaging said pinion.

4. An improved tool of the pliers type comprising a first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive pin is rotated, said drive pin and said movable jaw are moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin, said slot having a flat wall portion opposing said rack, a bushing disposed in said slot and slidably engaged with said flat wall portion, said bushing engaging said pinion, said drive pin including an upper polygonal portion, said second handle having an elongated opening receiving said polygonal portion, said opening having a polygonal wall portion corresponding to said polygonal portion for interlocking said second handle with said drive pin and semi-circular wall portion for permitting relative rotation of said second handle with respect to said drive pin.

5. An improved tool of the pliers type comprising a first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive pin is rotated, said drive pin and said movable jaw are moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin, said movable jaw including a bifurcated portion received over said offset portion and preventing pivoting of said movable jaw relative to said offset portion.

6. An improved tool of the pliers type comprising a

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first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive pin is rotated, said drive pin and said movable jaw are moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin, said movable jaw including a bifurcated portion received over said offset portion and preventing pivoting of said movable jaw relative to said offset portion, said drive pin being rotatably journaled in said bifurcated portion.

7. An improved tool of the pliers type comprising a first handle, said first handle including a hand grip portion at one end thereof, an intermediate offset portion at the opposite end of said first handle, a fixed jaw formed integrally with said offset portion remote from said first handle, a movable jaw slidably mounted on said offset portion for movement towards and away from said fixed jaw, said offset portion having an elongated slot there-through extending between said first handle and said fixed jaw, a rack extending into said slot from said offset portion, a drive pin carried by said movable jaw projecting through said slot, said drive pin including an intermediate pinion engaged with said rack whereby when said drive pin is rotated, said drive pin and said movable jaw also moved relative to said fixed jaw, and a second handle connected to said drive pin for rotating said drive pin, said movable pin including a bifurcated portion received over said offset portion and preventing pivoting of said movable jaw relative to said offset portion, said drive pin being rotatably journaled in said bifurcated portion, said slot having a flat wall portion opposing said rack, a bushing disposed in said slot and slidably engaged with said flat wall portion, said bushing engaging said pinion.

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