Oct. 1, 1940. A. E. ADAMSON 2,216,579

SEALING TOOL

Filed May 17, 1937 4 Sheets-Sheet 1

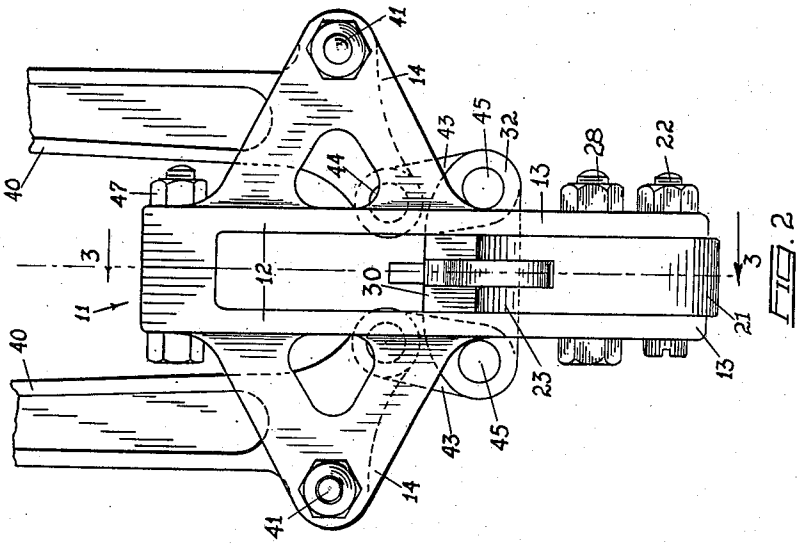


FIG. 2

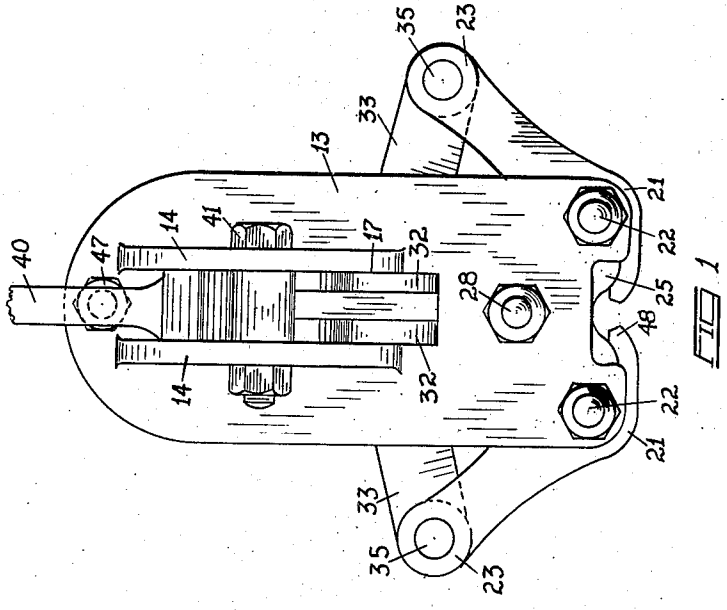


FIG. 1

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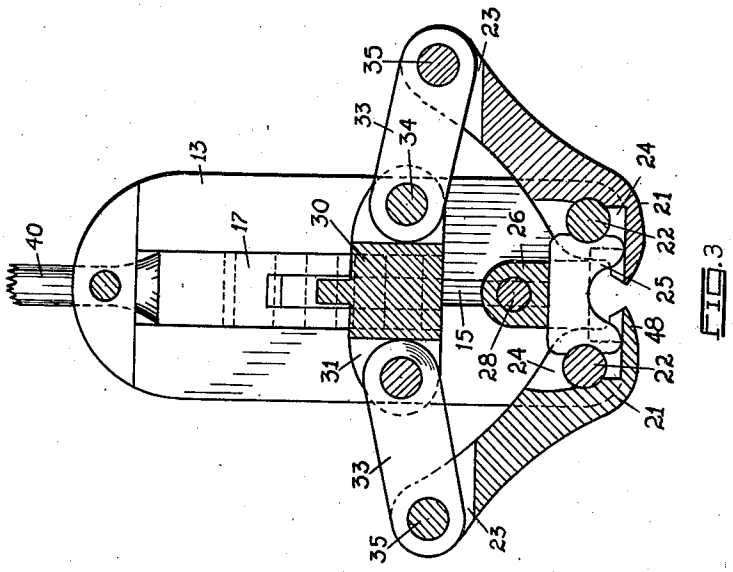


FIG. 3

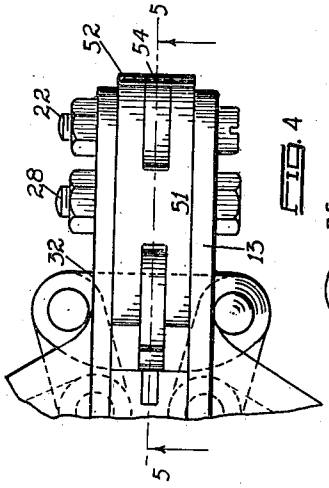


FIG. 4

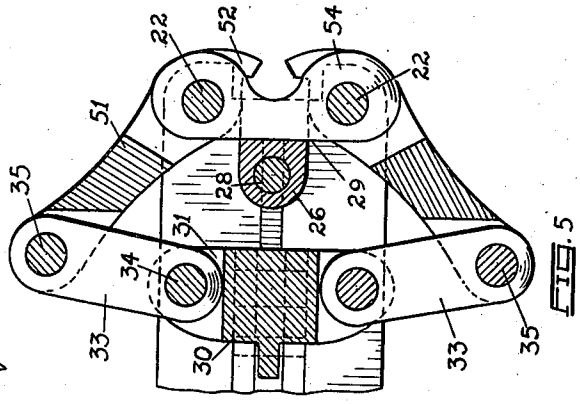


FIG. 5

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SEALING TOOL

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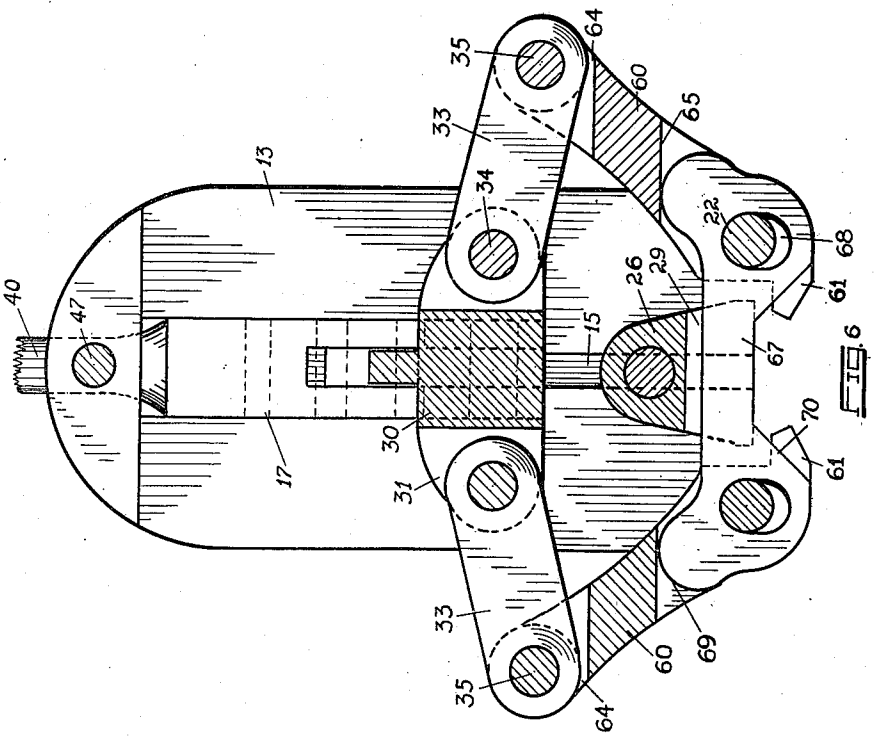


FIG. 6

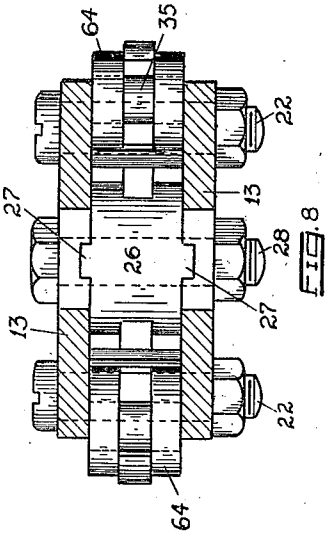


FIG. 8

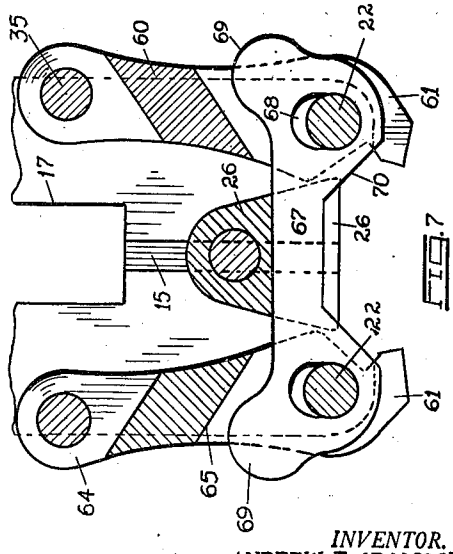


FIG. 7

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Oct. 1, 1940. A. E. ADAMSON 2,216,579

SEALING TOOL

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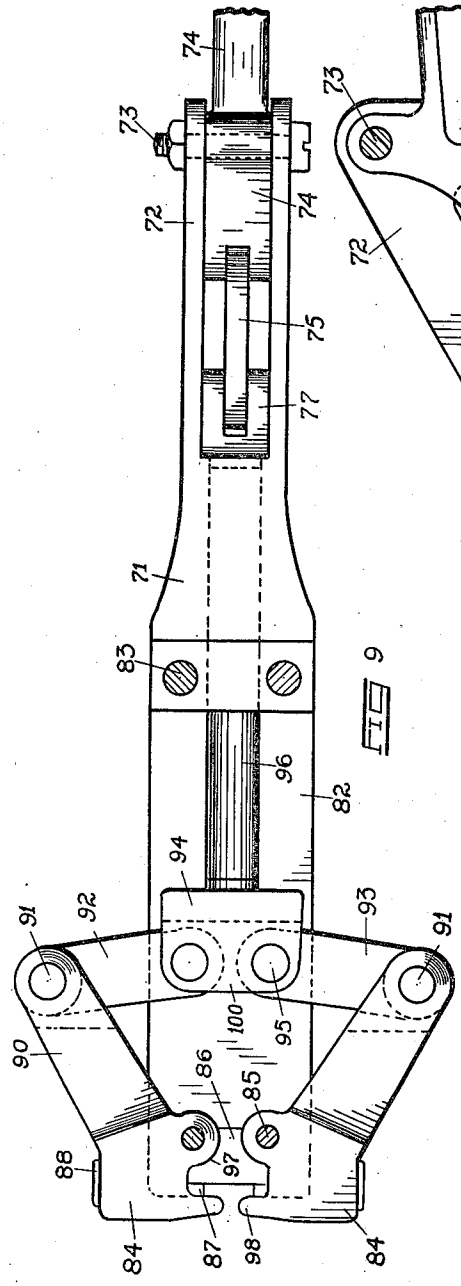


FIG 9

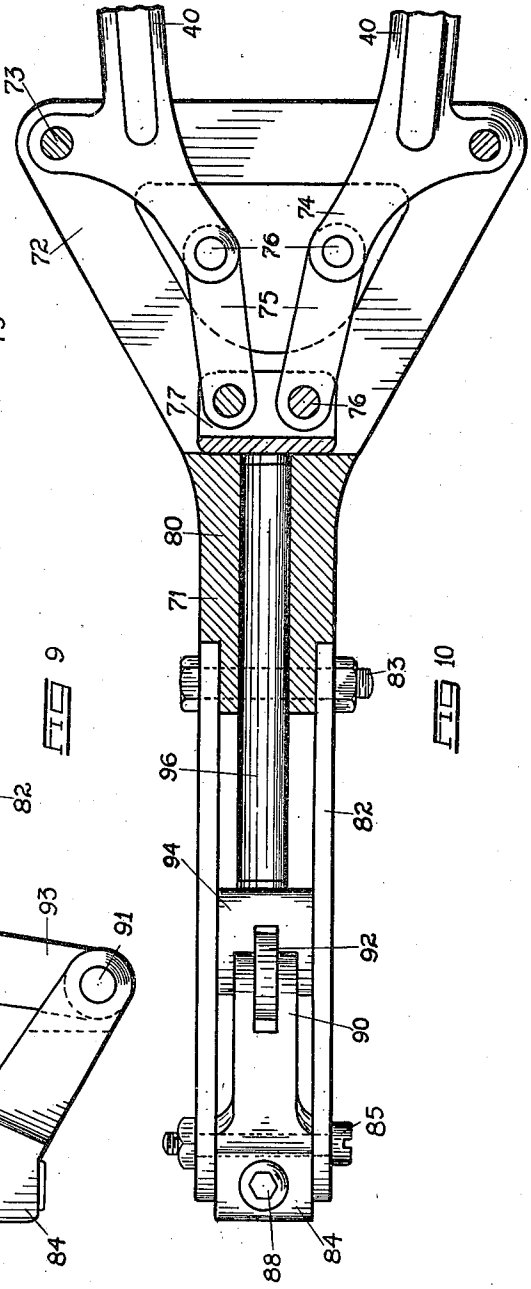


FIG 10

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Patented Oct. 1, 1940 2,216,579

UNITED STATES PATENT OFFICE

2,216,579

SEALING TOOL

Andrew E. Adamson, Warren, Ohio, assignor, by mesne assignments, to The Mahoning National Bank of Youngstown, Youngstown, Ohio, a national banking association, as trustee

Application May 17, 1937, Serial No. 143,132

3 Claims. (Cl. 81—9.1)

This invention relates to a sealing tool and more particularly to a device for forming interlocking deformations in overlapped portions of steel bands used for binding various objects together. According to the usual practice, the metal band or strap is tightened about the object or objects to be found by a suitable tensioning tool and to the overlapped portion of the tensioned strap or band an encompassing sleeve is placed. The sealing tool is then applied to the sleeve and effects the deformations to lock together the sleeve and the overlapped portions of the band or strap.

Since the sealing tool is operated manually and a great force is required to effect the seal, the hand grip portions of the tool must move through a relatively large traverse during the sealing operation. The force is best applied through pivotally mounted levers movable in a single plane, the outer grip portions moving towards each other. Heretofore the practice has been to place both the handle members and the deforming jaws of the tool in the same plane, the path of movement of the members and jaws being transverse to the direction of the band or strap on which the seal is being made. In certain situations space conditions may be such that sufficient space for movement of the handles in the transverse plane is lacking. The difficulty of effecting a satisfactory seal under these conditions is obvious. Since sufficient space for proper manipulation of the tool is seldom lacking in a plane including the direction of the strap or band I have devised a sealing tool having handle grip portions movable in a plane transverse to the plane of movement of the seal forming jaws.

Accordingly an object of this invention is to provide a tool for the purpose described and operable in the manner aforesaid which is simple in construction, rugged and durable, and which will effect the required deformations with a minimum of force exerted by the operator.

A further object of the invention is to provide in a tool of the kind described a construction wherein the relatively small dimensioned seal forming jaws, their immediate actuating elements, dies, and immediate supports are extended from the larger dimensioned elements of the tool whereby seals may be made in ordinarily inaccessible places.

Another object of the invention is to provide an improved deforming die and supporting means therefor whereby the construction of the tool is simplified and less force is required for its operation.

Yet another object of the invention is to provide improved means for mounting the anvil against which the sleeve is forced by the movable jaws and for mounting the die in relation to the anvil and jaws.

A still further object of the invention is to provide improved means for moving the die outward as the jaws compress the sleeve to reduce the force required to make the seal and to enable the tool to be more rugged and compactly built.

These and other objects and advantages of the invention will become apparent from a consideration of the drawings and the following detailed specification.

In the drawings:

Figures 1 and 2 are front and side views, respectively, of a tool constructed in accordance with my invention, the extended portions of the operating handles being broken away;

Figure 3 is a cross-sectional view of the tool of Figures 1 and 2 taken along the line 3—3 of Figure 2;

Figure 4 is a side view of a portion of a tool utilizing a modified means to support the die;

Figure 5 is a sectional view of the tool of Figure 4, taken along the line 5—5 of Figure 4;

Figure 6 is a sectional view of a similar tool in which the die and jaws are provided with coacting elements to move the die outward as the jaws close about the sleeve or overlapped strap portions;

Figure 7 shows the die and jaws of Figure 6 in retracted position;

Figure 8 is a top view of Figure 7 but showing the complete assembly; and

Figures 9 and 10 are side and top views, respectively, with parts broken away, of a modified form of tool in which the strap engaging elements are extended from larger dimensioned elements of the tool whereby a seal may be made in ordinarily inaccessible places.

Referring more particularly to Figures 1, 2 and 3, the tool consists generally of a frame 11, a pair of deforming jaws 21, a pair of manually operable levers or handle 40 and other elements to be specifically described.

Frame 11 consists of a pair of mating identical sections 12 each having a flat side plate 13 and a pair of spaced parallel ears 14 extending at right angles from said plate adjacent one end thereof. The plates 13 are each provided with a centrally disposed window 17 and a vertically extending groove 15 on their inner faces.

A pair of jaws 21 are pivotally mounted between the plates 13 on the hinge bolts 22 and are

provided with upwardly and outwardly extending portions having bifurcated ends 23. A portion of the center part of the jaws about the hinge bolts 22 is cut away at 24 to receive the ends of the one piece die 25 which extends between the bolts 22 and is backed by the anvil 26. As shown more clearly in Figures 6, 7 and 8, the anvil 26 is provided with a rib 27 on each of its opposing flat surfaces to fit within the grooves 15 of the side plates 13. A bolt 28 passing through the plates 13 and the anvil 26, rigidly secures the anvil in position, the anvil also serving as a spacing block to hold the plates 13 in proper spaced relation. The above described construction results in an exceedingly rigid and durable means to oppose the great force exerted by the jaws 21. The outer end of the anvil 26 is slotted at 29 to receive the die 25.

A crosshead 30 having forked arms 31 between the plates 13 and right angularly disposed forked arms 32 extending outwardly through the windows 17 is slidably mounted between the plates 13. A pair of toggle links 33 pivoted to the arms 31 by hinge pins 34 are connected to the bifurcated ends 23 of the jaws 21 by hinge pins 35.

The operating handles 40 for the tool are in the form of bell-crank levers and are pivotally mounted on the hinge bolts 41 passing through the outer extremity of the parallel ears 14 of the frame sections 12. The short legs of the levers 40 extend inwardly from the hinge bolts 41 and are pivotally connected at their inner ends to the toggle links 43 by means of hinge pins 44. The links 43 are in turn pivotally connected with the arms 32 by the hinge pins 45.

Sections 12 of the frame 11 are rigidly held together by the bolt 47 passing through their upper ends and by the bolts 22 and 28. Inward movement of the ends of the handles 40 results in downward movement of the cross-head 30 and inward movement of the jaws 21. In operation the overlapped strap ends having thereon the encircling sleeve is grasped along their side edges by the lips 48 of the opened jaws and as the jaws close in the sleeve is forced against the anvil 26 to tightly clamp the same, the die 25 causing a deformation or crimp to be made in opposed side edges of the sleeve and strap, the recesses 24 of the jaws 21 receiving the displaced metal. The anvil, die and jaw construction defined is rugged and durable and enables the sealing tool to be built with fewer parts. The die is simply constructed and may be easily replaced when worn or broken. By supporting the die by the jaw bolts 22 and the anvil 26, it is effectively restrained from canting or tilting movement and consequently a better seal may be made without increasing the force applied to the handles.

As obvious from an inspection of Figures 1 and 2, the use of the crosshead 30 and the two pairs of toggle links enables the tool to be constructed in such manner that the operating handles are movable in a plane normal to the plane of movement of the jaws 21. This feature renders the tool particularly useful in situations where space lateral to the reach of the strap or band is limited as where a seal is to be made on a band horizontally encompassing a low object lying on a floor.

Figures 4 and 5 illustrate a modified form of die and securing means therefor. The jaws 51 which correspond generally to the jaws 21 of Figures 1, 2 and 3 are bifurcated at their operating ends 52 to receive the ends of the die member 54 which ends encircle the jaw bolts 22. This construction enhances the solidarity of the die member in that the ends thereof are rigidly held against movement in any direction. As in the first form, the anvil 26 is slotted at 29 to accommodate the center portion of the die member.

Figures 6, 7 and 8 illustrate a further modified tool in which the jaw members 60, swingably mounted on the jaw bolts 22, are similar to the jaw members 51 of Figures 4 and 5 in that the the sealing ends 61 thereof are bifurcated, but the bottom surfaces 65 of the bifurcated ends extend obliquely to the longitudinal axes of the members. The flat unitary die member 67 is provided with elongated apertures 68 to receive the jaw bolts 22 to enable the die member to move outward relative to the anvil 26 and the jaw members 60. The ends of the die member have upwardly and outwardly extending projections with rounded edges 69 adapted to be engaged by surface 65 of the member 60 as the sealing jaws 61 move inward. Continued outward movement of the surfaces 65 results in outward movement of the die 67 forcing the surfaces 70 of the die into the side edges of the assembled overlapped strap ends and sleeve to form the interlocking deformations necessary to effect the seal.

The cam relation between surfaces 65 of the member 60 and the curved surfaces 69 of the die member 67 is such that the leverage effect is greatest at the point of initial movement of the die member, thus resulting in a more even distribution of the effort required to make the seal, the initial effort necessary to start the seal forming or to "break" being usually very great.

A sealing tool generally similar to that of Figures 1, 2 and 3 is illustrated in Figures 9 and 10. By the use of an elongated crosshead 94—96—77 and modification of the frame structure, the elements which would normally be positioned adjacent the strap or band on which the seal is to be made and which require little space for their operation are extended from the handle members and levers which require a large space for their operation. As in Figures 1, 2 and 3, the handles may move in a plane normal to the plane of movement of the sealing jaws.

Describing the tool of Figures 9 and 10 in detail, a block member 71 having spaced parallel wing projections 72 is provided with a longitudinally extending bore 80 to receive the reciprocating member 96 constituting a portion of the crosshead mentioned above. A pair of side plates 82 are rigidly fastened to the block 71 by the bolts 83 and pivotally support the jaws 84 between their outer ends, the jaws 84 being mounted on the jaw bolts 85. The jaws 84 are provided with extended lip portions 98 to engage the under side of the strap ends and sleeve and carry the metal deforming dies 87 in shouldered bores, the screws 88 locking the dies in position. A pressure block 86 having cylindrical surfaces 97 to fit against corresponding cylindrical surfaces of the jaws is positioned between the jaws and supported thereby. The cylindrical surfaces of the jaws 84 are concentric with the centers of the bolts 85 and therefore the block 86 is not moved by rotation of the jaws.

Slidable between the side plates 82 and connected with the member 96 is the connecting element 94 having spaced parallel flanges 100 between which are pivotally secured the inner ends of the toggle links 92 by means of the pins 95. The outer ends of the links 92 are connected to the bifurcated ends of arms 90 of the jaws

84 by the pins 91. The manually operated handles 40 are in the form of bell-crank levers and are pivotally mounted on the pins 73 extending through the outer ends of the wings 72. The short legs 74 of the levers 40 are pivotally connected with the outer ends of the toggle links 75 through the pins 76, the other ends of the links 75 being connected through pins 76 with an element 77 which in turn is secured to the end of member 96.

Outward movement of the levers 40 results in movement to the right of the crosshead 94—96—77, as viewed in the drawings, and outward movement of the jaws 84. The construction enables the plane of the levers to be normal to the plane of the jaws and enables the strap engaging elements to be inserted in small spaces which would bar the use of conventional tools.

It should be obvious that the die and anvil arrangements of the first described figures may be applied with equal facility to the tool of Figures 9 and 10.

As many changes may be made in the specific embodiments of my invention as herein disclosed without departing from my invention, the described embodiments should be considered as illustrative only and not in a limiting sense.

Having thus described my invention what I claim is:

1. In a sealing tool, the combination of a pair of spaced parallel frame members, an anvil positioned and secured between said members, a pair of bifurcated jaws pivotally mounted between said members on hinge pins spanning said members, a metal deforming die member comprising a flat piece of metal, spaced elongated apertures in said die member, the ends of said die member lying within the slots of said bifurcated jaws with said hinge pins passing through said apertures, a slot in said anvil to receive a portion of said die member, means to operate said jaws, and means connected with said jaws and engaging said die member to move said die member outwardly as said jaws are moved inwardly.

2. In a sealing tool, the combination of a pair of spaced parallel frame members, an anvil positioned between said members, a slot in said anvil, a pair of jaws pivotally mounted between said members with said anvil therebetween, a portion of said jaws overlying said anvil when in closed position, a die member extending between said jaws, a portion of said die member lying within said slot, and means connected with said jaws and engaging said die member to move said die member outward as said jaws are moved to closed position.

3. In a sealing tool, the combination of a pair of spaced parallel frame members, a pair of arms having bifurcated jaws pivotally mounted between said members and hinge pins spanning the members, a metal deforming die member comprising a flat piece of metal having its ends positioned between the bifurcations of said jaws, elongated apertures in said ends receiving said hinge pins, inclined surfaces on said arms at the bases of the bifurcations, projections having curved outer surfaces on said die member adapted to be engaged by said inclined surfaces to move said die member outwardly as said jaws are moved to closed position.

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