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PLIER-TYPE ARTICLE-HOLDING CLAMP
HAVING A SPRING-PRESSED JAW
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Fig. 1.

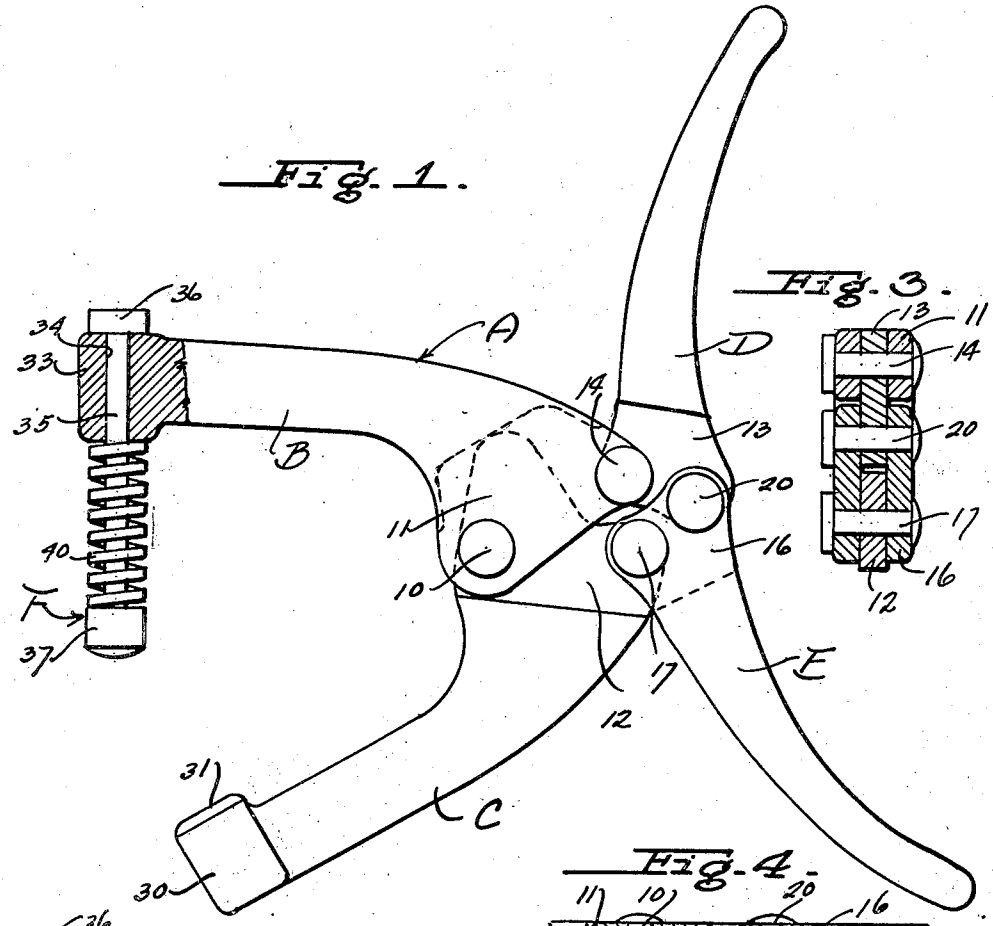


Fig. 3.

Fig. 4.

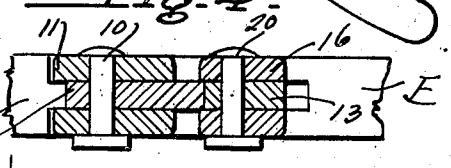


Fig. 2.

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PLIER-TYPE ARTICLE-HOLDING CLAMP HAVING A SPRING-PRESSED JAW

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1 Claim. (Cl. 81—46)

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This invention relates to improvements in clamps.

The primary object of this invention is the provision of a manually operated clamp adapted to be used for the clamping of a plurality of articles which it is desired to fasten together or upon which some work is to be performed, the clamp including a spring urged clamping jaw which is self-adjusting for different thicknesses of material being clamped together.

A further object of this invention is the provision of a clamp having a pair of relatively movable jaws connected by means of a manually operated toggle leverage; at least one of the jaws having resilient clamping means of a nature to be self-adjusting for the clamping of various thicknesses of material.

In many industries, such as in the aircraft industry, sheets of material of various thicknesses must be joined together. The joining may be by riveting, welding, glueing, etc. They must be securely clamped in accurate relation for the joining operation. The most generally accepted hand tool for this purpose is the conventional carpenter's C clamp. The operation of applying this clamp is extremely slow since it must be manually set to the thickness of the parts being clamped together. Our invention contemplates the provision of a pair of pivoted jaw arms secured by toggle leverage which may move the jaws in opened relation or lock them in clamping closed position. One of these jaws is provided with a spring loaded jaw member which securely cooperates with the other jaw to clamp articles of varied thickness together in an efficient manner without the necessity of adjusting said jaw members; the same being self-adjusting by reason of the spring loaded action thereof.

In the drawing, wherein for the purpose of illustration is shown only a preferred embodiment of the invention,

Figure 1 is a side elevation, partly in section, showing the jaws in an open position.

Figure 2 is a similar view showing the jaws of the clamp closed.

Figures 3 and 4 are cross sectional views taken substantially on their respective lines in Figure 2 of the drawing.

In the drawing, wherein similar reference characters designate corresponding parts thruout the several views, the letter A may generally designate the improved clamp. It may include jaw members B and C pivotally connected together and manually movable by a

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toggle linkage consisting of members D and E secured thereto in a manner to be subsequently described. The jaw arm B is preferably provided with spring actuated clamping means F.

The jaw arms B and C are preferably pivotally connected together by pivot pin 10 in plier fashion; the jaw B having a bifurcated end 11 into which the reduced portion 12 of the jaw arm C fits.

The toggle linkage consists of the member D having a reduced end 13 pivotally secured by a pivot pin 14 in the bifurcated portion 11 of the jaw arm B in spaced relation with respect to the pivot pin 10. The toggle member E is provided with a bifurcated end 16 receiving therein a corner portion of the reduced extension 12 of the jaw arm C to which it is pivoted by a pin 17. The two toggle levers D and E are pivotally connected by pin 20; the reduced extension 13 of lever D extending into the bifurcated portion 16 of lever E to accomplish the connection.

It will be noted that when the toggle levers D and E are in opened relation as shown in Figure 1, the jaw arms B and C will be opened to receive therebetween the desired articles to be clamped together. Manually, the operator with a single hand can move the levers D and E together. This action has the effect of moving the pivot pin 20 towards the pivot pin 10 and into the space between the pivot pins 14 and 17; moving the latter apart and swinging the jaw arms B and C together. The relation of the axes of the pins 14, 17 and 20 is such that when the levers D and E are in their most proximate position, the pin 20 will pass dead center of a straight line drawn thru the axes of the pins 14 and 17, as is shown by the dot and dash cross section lines 3—3 in Figure 2. This will lock the jaw arms B and C together and they cannot be opened until the toggle levers D and E are manually opened.

The jaw arm C has a jaw head 30 thereon provided with a hardened clamping seat 31. The other jaw arm B at its free end supports the spring actuated clamping means F. To that end the extreme end 33 of the jaw arm B is provided with a right angle passageway 34, slidably receiving therein a plunger pin 35 which may have an enlargement 36 on its outer end and at its other end facing the jaw arm C, it is provided with the clamping head or seat 37 of any desired shape, to accommodate the type of work with which the tool is to be used. The plunger 35 extends through a strong compression spring 40 between the head 37 and the end 33 of the arm

B. This spring normally urges the jaw head **37** into the position shown in Figure 1 of the drawing.

It will be apparent from Figure 2 of the drawing that when the toggle linkage is moved together for closing the jaw arms, the jaw head or member **37** will engage the seat **31** of the other jaw arm C and slightly compress the spring **40**, as shown in Figure 2.

The use of the tool will be apparent to those skilled in the art. The articles to be held together, so that they may be joined or otherwise operated upon, are held between the seat **31** and the jaw member **37**. The spring **40** is very strong and will hold the parts securely together until the desired work thereon is performed.

From the foregoing description of this invention, it is apparent that an improved hand operated tool has been provided which may be utilized for the purpose of clamping parts together. The toggle action gives the extreme leverage needed, and since the spring actuated jaw member is self-adjusting, there is no need for manual manipulation of an adjusting screw or other expedient in order to effect the clamping action. Time saving in the matter of production is necessary at any time, but under present day conditions, speed up of production is vital. With the use of this tool we have found that production can be speeded up to thirty per cent over other methods using manually adjustable clamps. In an accurate time study it has been found that at least one-half minute per clamping operation has been saved. Since many, many thousands of clamps are utilized in the aircraft and other industries, the total saving effected can readily be appreciated.

Various changes in the shape, size and arrangement of parts may be made to the form of invention herein shown and described, without departing from the function of the invention or the scope of the following claim.

We claim:

In a hand operated plier type clamping arrangement the combination of a pair of elongated jaw arms, means including toggle linkage pivotally connecting said jaw arms together at adjacent ends thereof whereby the outer free ends of said arms will swing thru an arc, said toggle linkage including means to hold the jaw arms in relatively open or locked closed positions, said toggle linkage including handles to pivotally actuate the toggle linkage and the jaw arms therethrough, the outer end of one of said jaw arms being transversely provided with a passageway, a plunger rod axially slidable in said passageway and extending at one end beyond said passageway in the direction of the other jaw arm, a clamping head upon said plunger rod located between the two jaw arms, a spiral spring under compression between said head and the jaw arm upon which the plunger is mounted normally urging the clamping head towards the outer end of the other jaw arm, and means on the plunger rod at the opposite side of the jaw arm from which the spring is mounted normally limiting the position to which the clamping head is urged by said spring.

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