July 9, 1946. D. LUBETSKY 2,403,666

TOOL

Filed Aug. 30, 1944

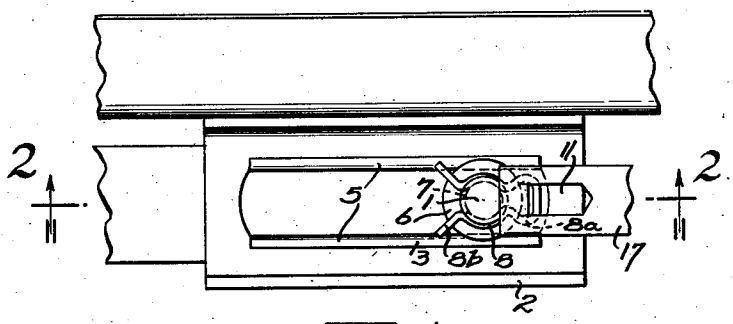


Fig. 1

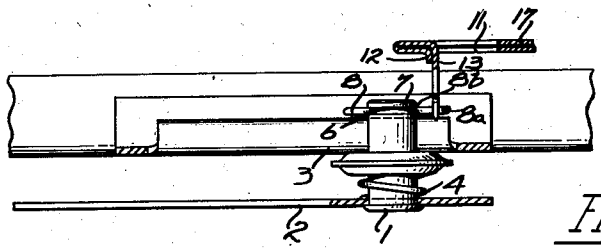


Fig. 2

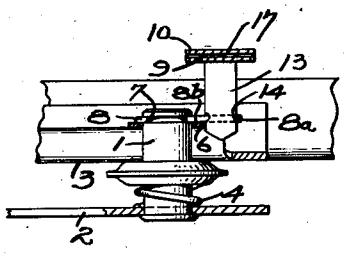


Fig. 3

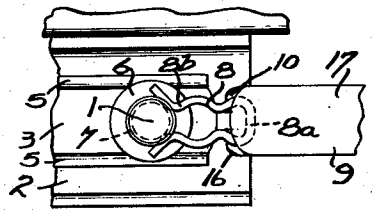


Fig. 4

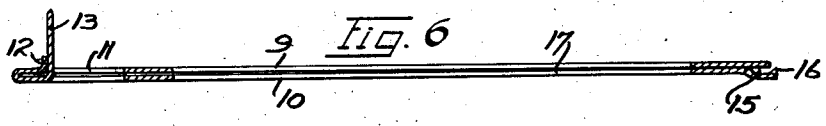


Fig. 6

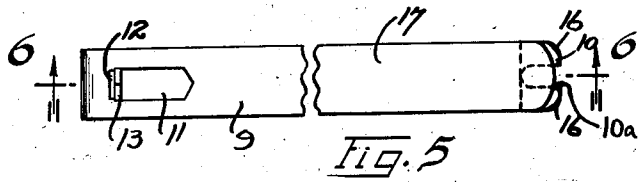


Fig. 5

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2,403,666

TOOL

David Lubetsky, Detroit, Mich.

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1 Claim. (Cl. 29—278)

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This invention relates to improvements in tools, and refers to a tool primarily intended for inserting and removing resilient bifurcated clips of the type commonly known in the trade as "hairpins." At the present time these resilient bifurcated clips are employed in many types of installations and engage opposite sides of an annular groove formed around a pin to retain the latter in position. Moreover these clips are often employed in locations where the working space is quite limited and consequently it is frequently very difficult to insert or remove them.

It is an object of the invention to provide a simple form of tool for holding these resilient bifurcated clips, so that with the aid of the tool such clips may be readily inserted around an annularly grooved pin or removed therefrom.

Another object of the invention is to provide such a tool which is both cheap and simple to manufacture.

Having thus briefly and broadly stated some of the objects and advantages of the invention I will now proceed to describe it in detail with the aid of the accompanying drawing, in which:

Figure 1 is a plan view showing an assembly including a resilient bifurcated clip and the tool in position to commence removing it.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a similar view showing the clip partly removed.

Figure 4 is a view showing a clip being inserted around a pin by the tool.

Figure 5 is a plan view of the tool, and

Figure 6 is a section on the line 6—6 of Figure 5.

Referring to the drawing, 1 designates a pin projecting through apertures formed in members 2 and 3, and 4 is a helical spring around the pin between the said members tending to retain them in spaced relation. Moreover the member 3 is provided with opposed inturned flanges 5 upon which is a washer 6 which encircles the pin 1, and formed around the latter is an annular groove 7. The pin is retained in its position shown in Figure 2 by a resilient bifurcated clip or "hairpin" 8, the legs 8b of which are outwardly bowed from one another intermediately of their length to engage opposite sides of the annular groove 7 and thus prevent disengagement of the pin 1. Due to the fact that in some assemblies these clips are hard to reach it is a matter of some difficulty to remove them, particularly since when they are being inserted they must be moved along a path extending at right angles to the axis of the pin.

My tool consists of a flat piece of material

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folded upon itself substantially centrally of its length and is somewhat resilient so that the strips of material 9 and 10 thus formed tend to remain substantially contiguous to one another throughout the major portion of their length.

Adjacent the folded end of the tool a longitudinal slot 11 is formed through one of the strips 9 and a portion of the material adjacent one end of the slot is outwardly turned to form a brace 12. Formed integral with the other strip 10 intermediately of its width is a finger 13 which is laterally bent to extend through the slot 11 and is supported on one side by the brace 12. It will also be noted in Figure 3 that opposed grooves 14 are formed in the opposite edge faces of the finger 13 toward its outer extremity, and beyond the grooves 14 the sides of the finger are inwardly inclined and come substantially to a point at their outer ends.

Adjacent the opposite end of the tool the strip 9 is flat and terminates slightly inwardly of the strip 10. The latter strip adjacent its outer extremity is stepped from the strip 9 to form a transverse open-ended slot between the said strips, the outer corners of the strip 10 are folded inwardly toward the other strip to form guides 16, and the stepped strip 10 is centrally slotted at 10a from its outer extremity to increase the resilience of the bifurcations thus formed and to facilitate the removal of the tool from a clip engaged between the bifurcations and the flat strip 9.

When it is desired to insert a clip 8 into engagement with opposite sides of an annular groove 7, the clip is first placed in the tool with the closed end of its head 8a resting against the base of the slot 15 and the head engaged between the strip 9 and the bifurcations formed at the extremity of the strip 10. The inner portions of the legs 8b of the clip then project outwardly between the guides 16 which limit the possible turning movement of the clip relative the tool. As pressure is applied to force the tool and clip toward the axis of the pin 1 the legs 8b are forced outward by opposite sides of the annular groove 7 and the clip is easily moved into position. In the drawing the tool is shown with its stepped strip 10 adjacent the washer 6, however if the latter is wide it is easier to insert the clip with the flat strip 9 adjacent the washer as that strip will slide freely over the latter with the clip in proper position to engage the groove 7. The laterally projecting finger 13 renders it easier to apply pressure to the tool to move it in the desired direction.

To remove the clip the finger 13 is inserted through the opening in the head 8a and is pressed down so that it extends below the washer 6 adjacent its outer periphery. Then the tool is turned and leverage is exerted against the edge of the washer which forces the clip out of engagement with the groove 7 as indicated in Figure 3. The opposed grooves 14 in the finger 13 are to receive the washer periphery and the head of the clip respectively during this operation.

While in the foregoing the preferred embodiment of the invention has been described and shown, it is understood that alterations and modifications may be made thereto provided they fall within the scope of the appended claim.

What I claim is:

A tool for engaging and inserting resilient bifurcated clips including a piece of resilient material folded upon itself substantially centrally of its length and transversely thereof forming two strips which rest contiguous to one another

for the major portion of their length, one of the strips adjacent its outer extremity being stepped away from the outer extremity of the other strip to form an open-ended slot between the ends of the strips, the opposite sides of the slot being adapted to frictionally engage opposite sides of a bifurcated clip and hold it with its open end projecting beyond and parallel with said strips, the base of the slot forming an abutment through which pressure may be exerted upon the closed end of the clip to force said clip along a path parallel with said strips, and one of the strips being slotted intermediately of its width adjacent its folded end and the other strip having an integral lateral projection extending through and beyond said slot, said projection being braced by one of the walls of said slot, said projection forming a pressure applying finger by means of which the tool may be moved in the desired direction.

DAVID LUBETSKY.