

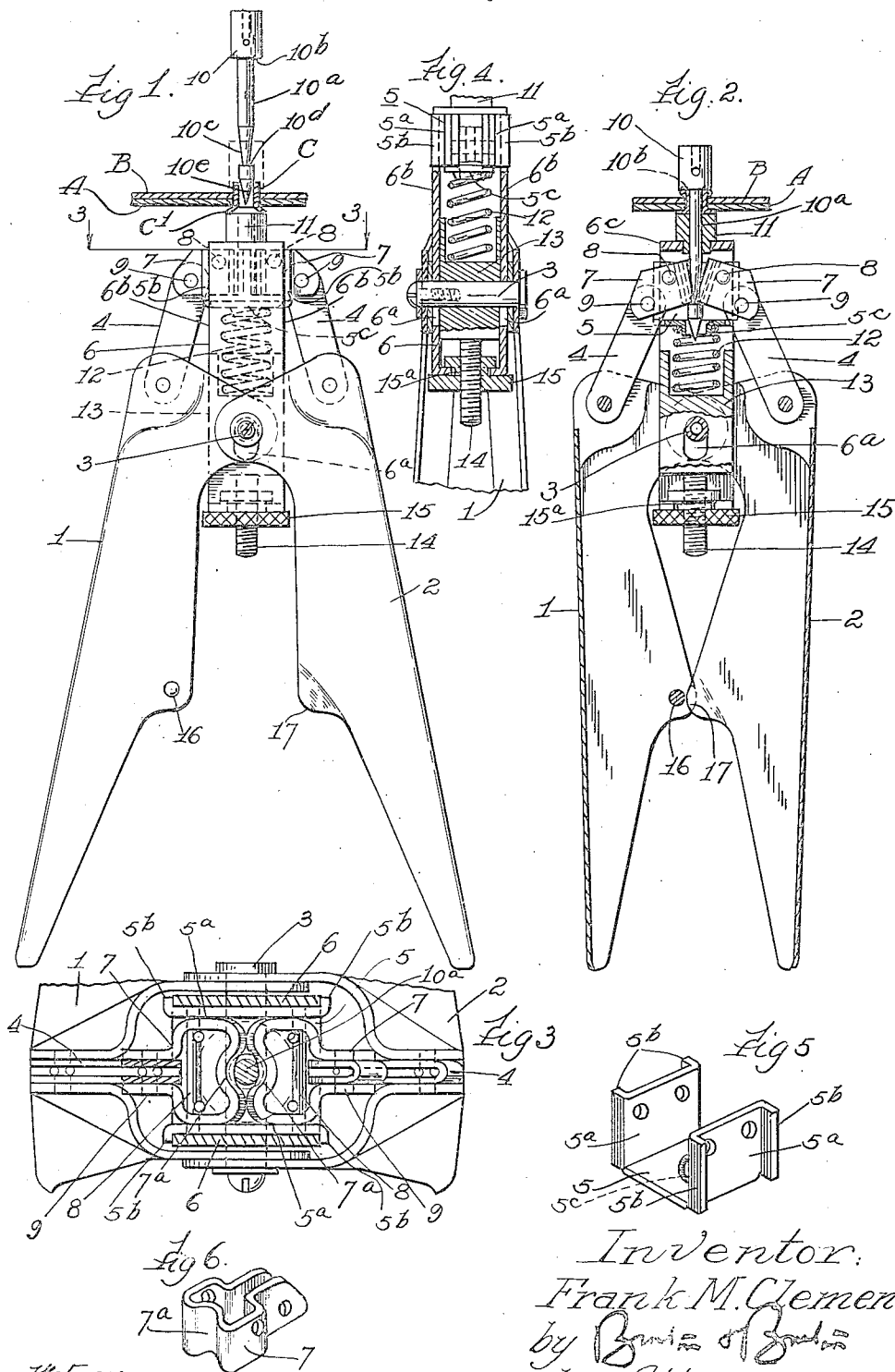
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EYELET SETTING DEVICE

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EYELET SETTING DEVICE

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This invention relates to a tool or device for setting eyelets or gromets in leather, textile fabric, wood or sheet metal, and it is particularly concerned with providing a mechanism adapted for use in awkward situations, as for example, where one side of the eyelet is disposed within a box or housing, or where it is placed at a considerable distance from the edge of the material in which it is secured. The invention consists of certain features and elements of construction, in combination, as herein shown and described, and as indicated by the claims:

In the drawing:

Figure 1 is a side elevation of a hand-operated tool embodying this invention, showing the separable die member disengaged from the operating mechanism, but partially inserted through an eyelet which is to be set by the tool.

Figure 2 is a side elevation of the same tool showing the parts at the limit of eyelet-setting position, with certain parts shown in section.

Figure 3 is a transverse section on an enlarged scale, taken as indicated at line 3—3 on Figure 1.

Figure 4 is a detail section taken as indicated at line 4—4 on Figure 3.

Figure 5 is a perspective view of the cross-head.

Figure 6 is a perspective view of one of the gripping jaws.

Most tools or devices for setting eyelets or gromets include a fixed frame having a throat-way, into which the sheet of material is introduced when the eyelet is to be secured therein. A fixed anvil or die is mounted at one side of the throat-way, and a movable die is guided for travel toward and from the fixed die, receding to the opposite side of the throat-way for admitting or releasing the material. Such a construction must be fairly heavy in order that the frame member withstand the necessary pressure exerted in deforming the eyelet between the two dies, and it also limits the distance at which the eyelet may be set from the edge of the material,—that is, this distance cannot exceed the depth of the throat-way. This type of construction is found in hand-operated tools, and also in larger machines in the nature of presses. My invention provides an arrangement by which one of the dies is made entirely separable from the remainder of the mechanism, and is provided with a shank adapted to extend centrally through the other die for engagement by the pressure-exerting means. This permits an eyelet to be placed at any desired point in the area of the sheet of material in which it is to be fixed, and then allows

the separable die member to be inserted in the eyelet with its shank projecting from whichever side of the material is most accessible, so that the pressure-exerting mechanism may then be applied to the shank for drawing the separable die toward the other die which is carried by the mechanism itself, and thus clinching the eyelet, as desired. After this operation, the separable member is detached from the mechanism, and its shank withdrawn from the eyelet.

In the drawing, Figure 1 shows a fragment of sheet material, A, to which another piece of sheet material, B, is to be attached by means of an eyelet, C. The setting tool is shown with a pair of handles, 1 and 2, pivotally connected at 3. These handles operate upon a cross head through links, 4, 4, so that movement of the handles, 1 and 2, toward each other, operates to draw the cross head toward the pivot, 3. The cross head, 5, is shown in perspective in Figure 5, and may be formed of sheet metal as a U-shaped member, having a middle portion and side members, 5^a, formed with guide flanges, 5^b, which engage the vertical edges, 6^b, of a frame member, 6. The links, 4, are not connected directly to the cross head, 5, but to jaw members, 7, which are pivoted at 8 to the cross head, and connected by pivots, 9, to the upper ends of the links, 4.

The jaw members, 7, are formed, as indicated in Figure 3, so as to receive between them the shank, 10^a, of a separable die member, 10. When the eyelet, C, formed with a single flange, C¹, has been inserted through the elements, A and B, as seen in Figure 1, the shank, 10^a, of the die member, 10, is inserted in the eyelet and passed through it to a position between the gripping portions, 7^a, of the jaws, 7. The shoulder, 10^b, of the enlarged or head portion of the part, 10, acts as a pressure die for crimping or flanging the eyelet, C. The cooperating die, 11, is mounted on the upper end of the frame member, 6, so that when the shank, 10^a, is gripped by the jaws, 7, 7, and drawn downwardly by the travel of the cross head, 5, toward the pivot, 3, the shoulder, 10^b, is moved forcibly toward the opposing die, 11, to a final position, such as that shown in Figure 2.

The gripping of the shank, 10^a, by the jaw members, 7, 7, is effected by the slight rocking of said jaws about their pivots, 8, 8, when tension is initially applied to the links, 4, 4. This tilts the lower edges of the jaws toward each other, reducing the distance between them and causing them to grip the shank, 10^a. To further insure a positive hold, the shank is tapered and reduced

at 10°, forming a shoulder, 10^d, a short distance back from its lower end, which may positively engage the lower edges of the jaws, 7, 7, if they should tend to slip upon the shank during the initial portion of the downward movement of the cross head, 5. And for facilitating entry of the shank into the eyelet, its lower end may be pointed at 10°, as shown in the drawing.

Return movement of the parts to normal position is effected by the spring, 12, which is pocketed in a block, 13, carried in the frame, 6, and which presses upwardly against the under side of the transverse or middle portion of the cross head, 5. Preferably, this portion is formed with an annular flange, 5^c, serving to position the spring, as seen in Figure 2.

The stroke of the device is preferably made adjustable to correspond with the thickness of the elements, A and B, to which the eyelet is to be secured. For this purpose the lower end of the block, 13, has a threaded stud, 14, extending downwardly from it, and carrying a specially formed knurled nut, 15. An annular groove, 15^a, in the nut, 15, engages the lower end of the frame member, 6, so that rotative adjustment of the nut, 15, moves said frame up or down with respect to the block, 13. The pivot, 3, as seen in Figure 4, is definitely positioned in the block, 13, while the frame, 6, is formed with vertically extending slots, 6^a, through which the pivot, 3, extends, and which permit of the adjustment of the frame, 6, relatively of the block, 13. The operation of the adjusting nut, 15, on the threaded stem, 14, shifts the frame member, 6, with respect to the block, 13, and thus with respect to the pivot, 3; this alters the distance between said pivot and the die member, 11, and correspondingly varies the distance between the die member, 10, and the die, 11, at the limit of their clinching position. The handles, 1 and 2, are stopped against each other at this limiting position; as indicated in Figure 2, each of the handles is of channel-shaped cross-section, and the handle, 1, is provided with a cross pin, 16, which engages the slightly intumed edge portions, 17, of the channel sides of the handle, 2. In other words, the handles are always stopped at the same limiting position as they are closed together.

As seen in Figure 3, the links, 4, are preferably made of folded sheet metal so that each link consists of two side bars connected by folded portions at their ends. This permits the pivots at the upper and lower ends of these links to be made of straight stock which is slightly offset, as seen in Figure 3, between the two side bars of each link for retaining the pivots in position without the necessity of providing them with heads, or riveting the ends. This provides a smooth, neat construction which is also economical.

It may be understood that in addition to returning the parts to initial position the spring, 12, acts to yieldingly delay the downward movement of the cross-head when the handles, 1 and 2, first approach each other in the initial part of the working stroke. This ensures the rocking of the jaws, 7, 7, for gripping the shank, 10^a, of the removable die before the jaws are drawn downwardly.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and re-arrangements of the parts may be made without departing from

the spirit and the scope of the invention, and that the same is not limited to the particular form herein shown and described, except in so far as indicated by the appended claims.

I claim:

1. An eyelet-setting tool comprising a fixed die having a central aperture, a removable die having a stem formed to extend through said aperture, said stem having a shoulder facing opposite the working face of the die itself and spaced therefrom at a predetermined distance, together with operating mechanism associated with the fixed die and including a part movable to admit the shoulder portion of said stem when the stem is inserted through the aperture of the fixed die and contractible around the stem for encounter with said shoulder, means for driving said shoulder-encountering part in a direction to draw the working faces of the dies toward each other to clinch an eyelet, and stop means for limiting the movement of the driving means whereby said shoulder will be positioned a predetermined distance from said fixed die at the end of the clinching movement.

2. An eyelet-setting machine comprising a fixed die and a movable die, the fixed die being centrally apertured, and the movable die having a stem formed to extend through said aperture, together with operating mechanism having a working stroke in the direction of the axis of said stem, and including means for engaging the stem when it is inserted through said aperture, together with means for adjusting said working stroke of the operating mechanism to vary the distance of the movable die, at the limit of its movement toward the fixed die, from the fixed die in clinching the eyelet.

3. An eyelet-setting machine comprising a fixed die and a movable die, the fixed die being centrally apertured, and the movable die having a stem formed to extend through said aperture, together with operating mechanism associated with the fixed die comprising a guide, a cross-head movable on said guide toward and from the fixed die, a pair of pivoted jaws carried on the cross-head, and linkage for moving the cross-head connected thereto through said jaws in such a manner that stressing said linkage swings the jaws into position for gripping the stem of the movable die when the latter is inserted through the aperture of the fixed die.

4. An eyelet-setting machine comprising a fixed die and a movable die, the fixed die being centrally apertured, and the movable die having a stem formed to extend through said aperture, together with operating mechanism associated with the fixed die comprising a guide, a cross-head movable on said guide toward and from the fixed die, a pair of jaws mounted on the cross-head and disposed at opposite sides of the stem of the movable die when the latter is inserted through the said aperture, said jaws having concave faces disposed for contact with said stem, and each being pivoted to the cross-head, together with operating links connected to said jaws at a distance from their pivots respectively, and means connected to said links for moving the cross-head, the working stress on said links serving to rock said jaws about their pivots and cause them to grip the stem of the movable die.

5. An eyelet-setting tool comprising a pair of handles pivoted together, a fixed die associated with said handles and having a central aperture, a removable die formed with a stem to extend through said aperture when the working face of the die is disposed opposite that of the fixed die,

a frame member supporting said fixed die and connecting it with the handles, a cross-head guided on said frame for movement toward and from the fixed die with operating connections from said cross-head to the handles, and means on the cross-head for detachably engaging the stem of the removable die.

slidably mounted on the block, a cross-head guided for movement on the frame member toward and from said pivot of the handles with links connecting said cross-head to the handles for such operation, said frame supporting the fixed die, and said cross-head having means for detachably engaging the stem of the removable die, and adjustable means connecting said frame and said block for shifting the frame with respect to the pivot of the handles and thus shifting the fixed die.

8. In the combination defined in claim 7, said adjustable connection comprising a threaded stem on the block, and a captive nut in the frame member engaging said stem and rotatable in the frame for effecting the adjustment.

9. An eyelet-setting tool comprising a pair of handles pivoted together, a fixed die associated with said handles, and having a central aperture, a removable die formed with a stem having a tapered terminal and a shoulder intermediate said terminal and the working face of the die, a pair of jaws between which said stem extends when entered through the aperture of the fixed die and with which its said shoulder interlocks, and means connecting said jaws to the handles for movement thereby in a direction to draw the working face of the removable die toward the working face of the fixed die for clinching an eyelet.

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