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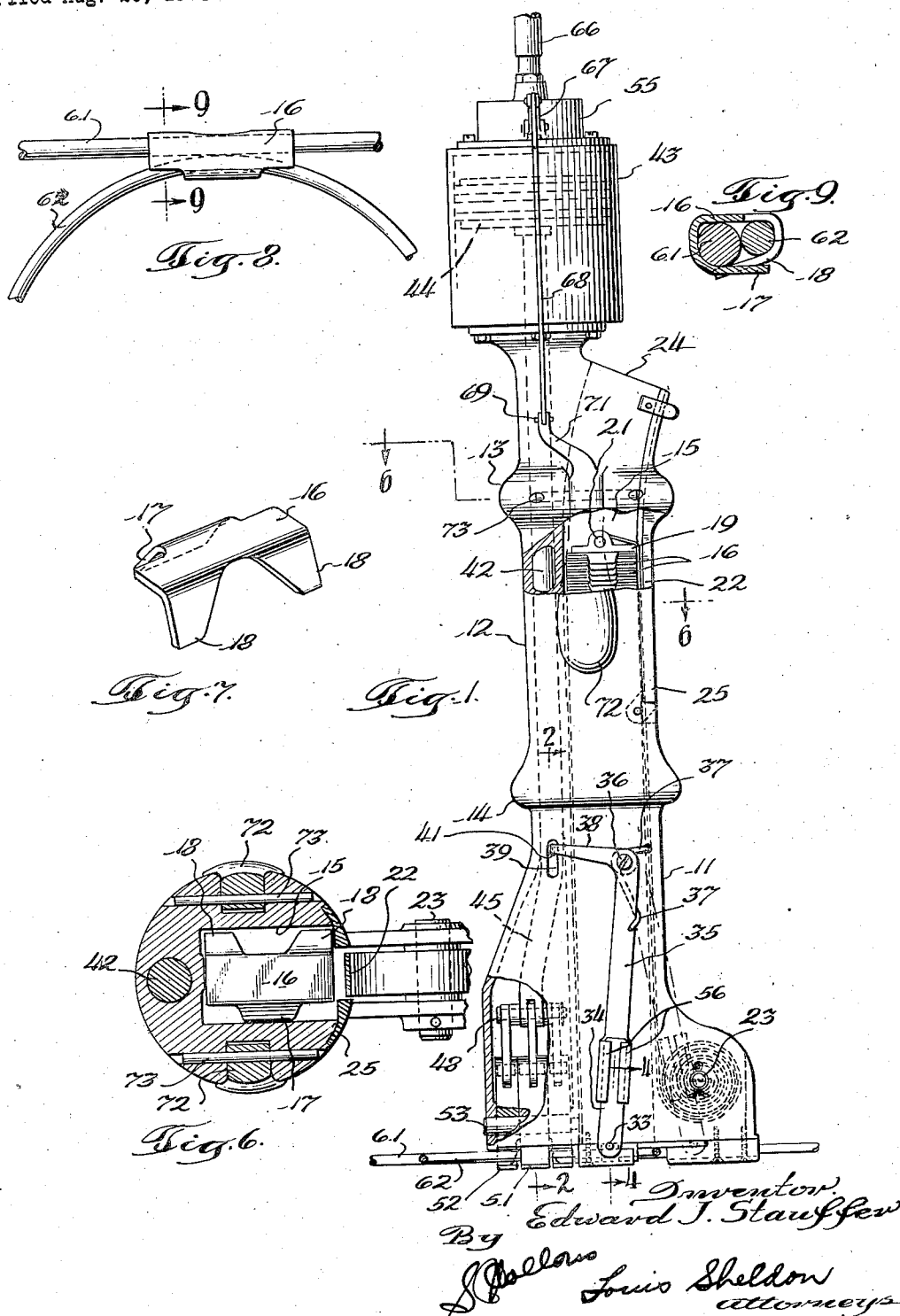
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UPHOLSTERER'S APPLICATION TOOL

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2 Sheets-Sheet 1



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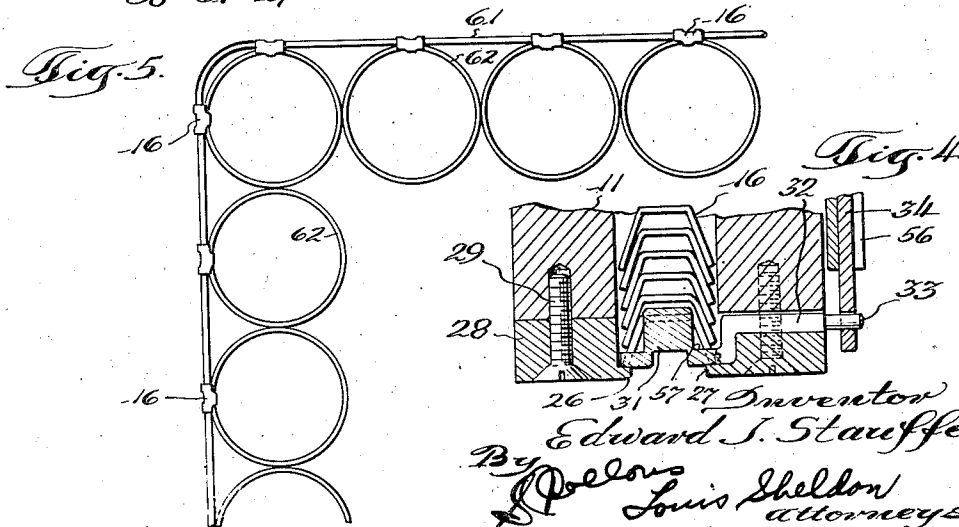
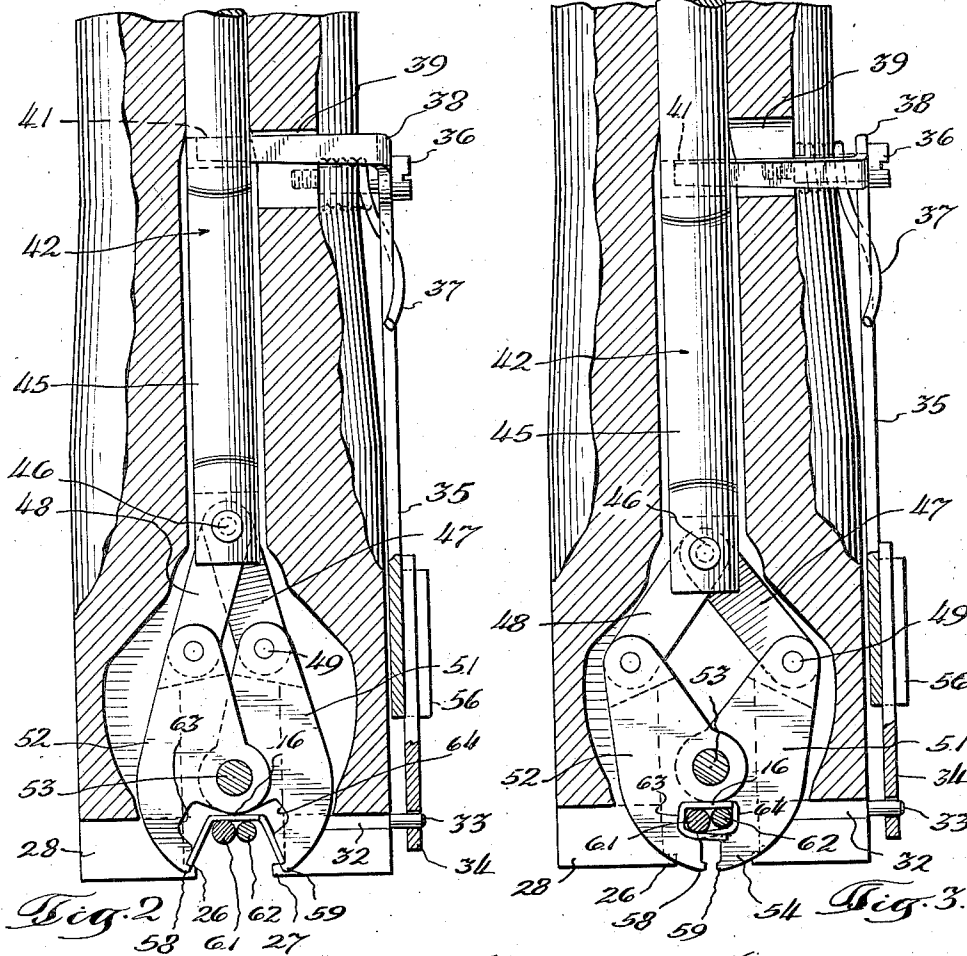
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UPHOLSTERER'S APPLICATION TOOL

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The present invention relates to clip applicator tools and more particularly to a power actuated magazine storage device for applying assembly clips to coil spring structures of the kind utilized in upholstered furniture.

The principal object of the present invention is to provide a power actuated mechanism for advancing upholsterers' assembly clips from a storage magazine position to an application position and to thereafter apply the clip by crimping its lug formations to wrap about and securely hold the coil spring units to an upholstery outlining frame of wire or rod material.

In many classes of upholstered furniture, spring cushioned seats, etc., helical or conical coil springs are assembled in rows and secured in position to a perimetric framework. At the point of tangency of the upper convolutions of each coil to a metallic wire which constitutes the perimetric frame, mechanical securement is effected by the application of an encircling clip in addition to which the coils are secured to each other by various inter-connecting devices, such as coil springs, rope ties and other media. In the process of assembling coordinate rows of coil springs, an operator is required to hold each spring in position and then to exert a manual force sufficient to effect the necessary shaping of the binding clip. While placing the clip with its applicator tool, a slight exertion of force is necessary in order to retain the clip in position within the applicator tool. These various precautions are excessively bothersome and require skill in order to be performed at even a low rate of assembly.

The present invention proposes an apparatus which will retain a substantial supply of applicator clips in a magazine column to be fed one at a time to the clamping position. In addition, means are provided for retaining the clip in the clamping position against inadvertent displacement and in readiness to be set down upon a spring and frame assembly with but little skill requirement during operation. The apparatus is adapted to be suspended by counterpoise weights so as to afford exceeding facility for manipulation with one hand and so to be operated by the same hand as is used in holding, leaving the other hand free to perform adjustments and placement operations when necessary. By exerting a slight squeezing pressure, which may be executed with great facility regardless of the position angularly in which the machine is held, an air cylinder operating plunger is actuated to effect the clamping operation and upon its release, clip feed mechanism is automatically responsive to posi-

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tion a succeeding clip in readiness for another operation.

With the foregoing and other objects in view, the present invention consists of a simple and compact arrangement as will now be described in particular detail, having reference to the accompanying drawings and to the following detailed specification, in which like reference numerals designate corresponding parts throughout and, in which:

Fig. 1 is a side elevation of an automatic upholsterer's clip applicator tool having embodied therein certain features of the present invention;

Fig. 2 is a transverse sectional view taken approximately on line 2—2 of Fig. 1 and featuring the clamping jaws in relaxed position;

Fig. 3 is a transverse sectional view similar to Fig. 2 showing the clamping jaws in operated position;

Fig. 4 is a fragmentary detail view taken approximately on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary plan view of an upholstery frame assembly showing the manner in which the clips may be employed for securing the contiguous coil convolutions to the perimetric wire frame;

Fig. 6 is a transverse sectional view taken approximately on line 6—6 of Fig. 1;

Fig. 7 is a perspective view of one of the clips;

Fig. 8 is an enlarged detail view of one of the clips applied onto the tangent point between a coil spring and a perimetric frame rod; and

Fig. 9 is an enlarged detail section taken approximately on line 9—9 of Fig. 8.

Referring now more particularly to the drawings, the reference character 11 designates a principal supporting body shaped at 12 to afford convenience for gripping so that the operator's hand may be confined by the limits of the hilt ridges 13 and 14. Cross-sectionally the body is substantially circular, as best indicated in Fig. 6, and is provided with a rectangular channelway 15, in which there may be received a supply column of clips 16 nested one upon the other, after the manner best designated in Figs. 1 and 4. Each clip is provided on one side with a central tab or tongue 17 and on its other side with a pair of spaced tabs 18. The spacing and arrangement of the tabs 17 and 18 is preferably such that the space intervening the tabs 18 is equivalent to the width of the tab 17, whereby the tabs may be cut from a continuous strip with no wastage.

In order to assure their descent, the clips are urged downwardly in the magazine chute 15 by

a follower block 19, which is carried pivotally as at 21 on the looped end of a clock spring 22 anchored and wound around the shaft 23, after the manner best indicated in dotted outline, Fig. 1.

Replenishment of clips 16 may be had through a continuation of the opening of chute 15 upwardly through the casting of the principal body 11, as at 24, or if preferable, a curved aperture door 25 may be provided with appropriate detent retention means through which the clips may be inserted sidewardly. The lowermost clip is designed to rest upon a track afforded by the underhanging ribs 26 and 27 of the face plate 28, Fig. 5, which member is secured as by the screws 29 to the body stock 11. A shuttle carriage 31, which rests upon the track 26-27, is provided with a sidewardly extending arm 32 pivotally engaged as at 33 to the lowermost extremity of a telescoping arm extension 34 of a bell crank lever, whose principal arm 35 is spring urged in a clockwise direction about the pivot 36 by a helical spring 37.

The opposite arm 38 of the bell crank has its extremity bent over at right angles so as to extend inwardly through a slot 39 of the body 11 and be received in an aperture 41 of a piston rod 42. The upper extremity of piston rod 42 extends into a piston housing 43 and is integrally associated with the air operated piston 44 in the conventional manner. The lower extremity of rod 42 is slightly offset, as best indicated at 45 in dotted outline, Fig. 1, and terminates with a common pivot 46 for a pair of symmetrically opposite leverage links 47 and 48, the former of which is pivoted as at 49 to one clamping jaw 51 and the latter to the opposite clamping jaw 52.

Clamping jaws 51 and 52 are mutually pivoted at 53 and are provided with appropriate jaw sections to correspond with the lugs 17 and 18 of the clips 16, that is to say, jaw 51 has a single and central jaw element 54 to engage the single lug 17, while jaw 52 has a pair of spaced jaw elements; each for engaging one of the lugs 18 in order to effect the clamping operation indicated in Fig. 3.

When the piston 44 is actuated by permitting the entrance to its operating side of air under pressure through a control valve 55, rod 42 is thrust downwardly spreading the link levers 47 and 48, after the manner indicated in Fig. 3, rocking the jaws 51 and 52 into the position shown in this illustration, and rocking bell crank lever 35-38 counter-clockwise about its pivot 36. As a result of the latter movement, a pivot 33 is moved rightwardly as arm extension 34 slides within the confining lips 56 of arm 35 and shuttle 31 is moved to the right so that a previously supported clip 16 which had been resting on the shoulders 57 of the shuttle 31 descends to be supported instead upon the tracks 26 and 27. Thereafter, upon the resumption of normal position by the elements actuated through piston rod 42, bell crank 35-38 resumes its clockwise position and shuttle 31 is moved to the left, Fig. 1.

This movement on the part of shuttle 31 causes the ultimate clip 16 to be shifted leftwardly and be brought into alinement with the supporting lips 58 and 59, which are integrally formed with the jaws 52 and 51, respectively. The position of the clip 16 awaiting the operation of the clamping jaws is as indicated in Fig. 2, and in this condition the apparatus may be placed over the perimeter wire 61 and the coil wire 62 in readiness for the forming of the clip into the holding clamp. It will be observed further that jaw 52 is recessed

as at 63 to accommodate the greater radius diameter which is to be formed around the relatively thicker perimeter wire 61, whereas the jaw 51 is provided with a smaller cut-away portion 64 to correspond with the relatively smaller diameter of the coil wire 62.

Upon each operation of the apparatus, the shuttle 31 is moved rightwardly to permit a succeeding clip 16 to drop to the level of the track 26-27 and upon the restoration movement, shuttle 31 resumes its left hand position, as shown in Fig. 1. In order to make for greater convenience, it is proposed that automatic clamping units of the type described be supported from a counterbalanced weight so that the weight of the apparatus itself may be eliminated as a labor factor and the counterpoise may be suitably fastened to the unit by providing an element integral with the piston housing or cylinder wall 43.

Air for operating the piston 44 may be admitted through a supply pipe 66 under the control of a double control valve of any conventional design 55, one on each side as represented in Fig. 1. The valve may be actuated by a bell crank lever 67 when the latter is pulled downwardly by a control link 68. Each control link 68 is pivoted as at 69 to an arm 71 integrally formed with a pivoted gripping lever 72 for which appropriate recessing may be provided in the wall of the body 11 and for which pivoted support may be had as at 73 in pivot rods that extend through hilt ridge 13.

During operation it is necessary but for the operator to exert a firmer grip or squeeze upon the handle region 12 in order to effect the actuation of one or both of the control handles of the control grips 72, whereby to cause the opening of the control valve 55. Upon relaxation of this pressure, the valve 55 seals and bleeder ducts in well known manner permit the escape of the actuating fluid whereupon by appropriate spring pressure the elements resume their normal condition.

While the present invention has been explained and described with reference to a particular embodiment, it is to be understood nevertheless that numerous variations and modifications are contemplated within the realm of the disclosure. It is accordingly not intended to be limited by the details featured in the accompanying drawings, nor by the precise language of the foregoing specification, except as indicated in the hereunto appended claims.

The invention claimed is:

1. A power operated clamping apparatus comprising a vertical housing member enclosing a magazine channelway for a stack of nested upholsterer's clips longitudinally thereof and enclosing also a journal for an operating rod paralleling said channelway, trackway means for supporting the lowermost of a series of clips contained in said magazine channelway for transverse shuttle movement, a set of clamping jaws for processing each clip after it has been advanced in said shuttle movement, a bell crank lever operated by said rod to shuttle each clip from its magazine channelway position to its clamping jaw position and to return for a subsequent clip.

2. The combination set forth in claim 1, including a fluid operated piston, a supporting grip defining a central portion of said housing and control means for said piston located at and actuated by squeezing the supporting grip of said apparatus.

3. A power operated apparatus for storing and

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applying strapping clips comprising, a vertical member having a magazine channelway longitudinally thereof for carrying a stack of upholsterer's clips in straddled alignment and a bore paralleling said magazine channelway, an operating plunger extending through said bore, means for supporting the lowermost of said stack of upholsterer's clips contained in said magazine at a lowermost portion of said vertical member for subsequent transverse shuttle movement, a set of clamping jaws actuated by said operating plunger for forming each clip after it has been advanced through said shuttle movement, a bell crank lever actuated by said plunger in a direction from shuttle advancement position to a new clip engagement position and spring means acting upon said bell crank lever upon the return movement of said plunger to advance a clip from its magazine storage to its jaw clamping position.

4. In a device for storing and applying upholsterer's clips, a main body member supporting at one end thereof a pneumatic piston actuator and at its other end clip feeding and clip clamping mechanisms, and an intermediate portion to said main body member comprising a shaped handle susceptible of being encircled by an operator's manual grip and including a portion affording a passageway for a piston rod connecting said actuator and said clamping mechanism, a portion affording a passageway and magazine storage for a succession of nested upholsterer's clips in superimposed straddle alignment, and a squeeze trigger within the longitudinal confines of said handle for regulating the admission of operating fluid to said pneumatic actuator.

5. In an applicator tool for upholsterer's clips, a principal body member shaped to afford a cen-

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tral handle support of such slender proportions as to be encircled by an operator's grip, a pneumatic actuator mounted at the upper end of said member including a thrust rod extending through a longitudinal bore in said handle support, a storage and feed magazine curving into and extending longitudinally through said handle support for housing and directing a nested stack of upholsterer's clips, valve control triggers flanking said handle support for regulating the admission of operating fluid to said actuator, a pair of clip forming jaws and toggle levers acted upon by said thrust rod for closing each of said clips about upholstery frame elements, and a terminal portion at the lower end of said body member through which said clips are directed to clamping position including a bell crank lever spring urged to clip advancing movement and returned to engage succeeding clips by a camming action imparted by said piston rod during its clamp actuating stroke.

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