S. J. TURNER.

STRAP TIGHTENER AND FASTENER.

APPLICATION FILED MAR. 7, 1919.

1,408,846.

Patented Mar. 7, 1922.

2 SHEETS—SHEET 1.

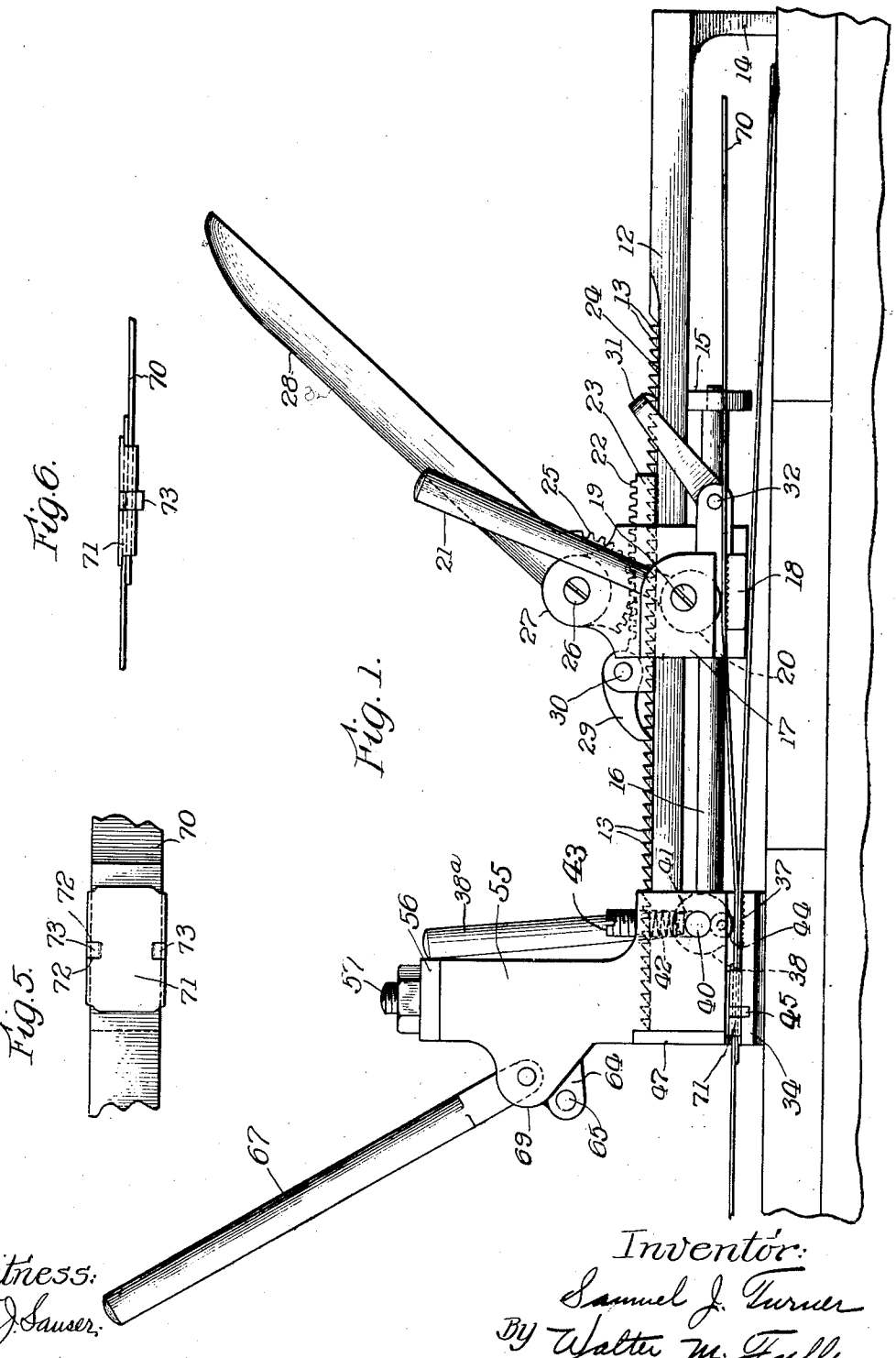


Fig. 1.

Fig. 6.

Fig. 5.

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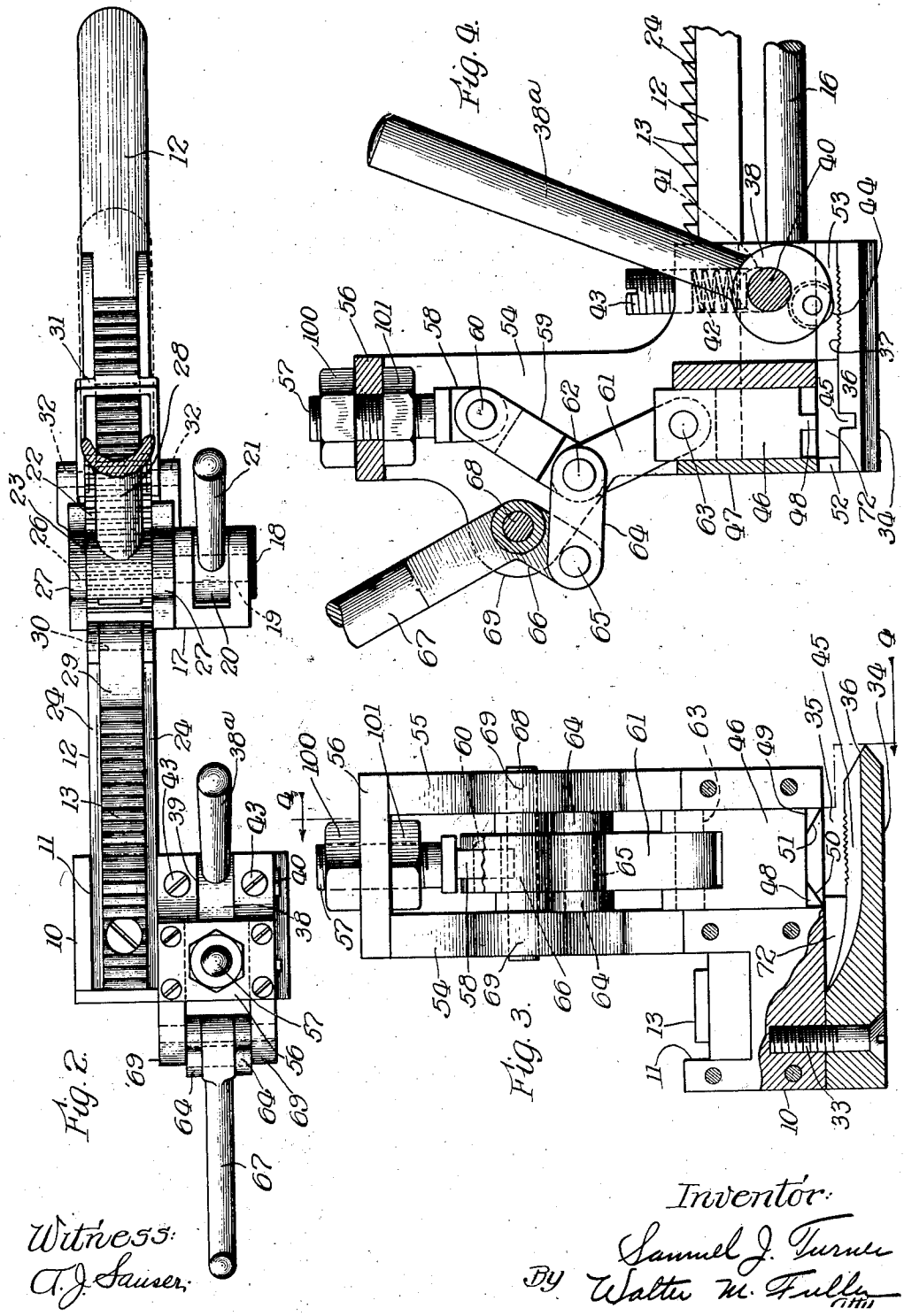


Fig. 2.

Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

SAMUEL J. TURNER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO OTTO RABE, OF WILMETTE, ILLINOIS; THE NORTHERN TRUST COMPANY AND OTTO RABE, EXECUTORS OF THE WILL OF SAID SAMUEL J. TURNER, DECEASED.

STRAP TIGHTENER AND FASTENER.

1,408,846. Specification of Letters Patent. Patented Mar. 7, 1922.

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To all whom it may concern:

Be it known that I, SAMUEL J. TURNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Strap Tighteners and Fasteners, of which the following is a specification.

Various devices have heretofore been produced for the tightening or straining of the flat metal bands or ribbons commonly employed for confining or constricting containers or bales of several varieties. Also sundry types of fastener securing mechanisms have been suggested for causing fastening clips to hold or bind together the overlapped ends of the tense bands or straps. In so far as I am acquainted with these different and independent appliances they all have some one or more defects, weaknesses, or possibilities of advantageous improvement, and it is the aim of the present invention to so construct a combined strap-tightener and fastener-clamping mechanism that the bands or straps can with greater ease and dispatch be strained or made taut and their ends bound or attached together while in that condition. A further aim of the invention is the provision of a simple appliance which will tighten a metal band around a body and secure it against loosening before the band or strap is severed from its supply roll. An added purpose of the improvements is the association together of the band-stretcher and fastening operating or clamping means so that they will always be in proper relation to perform their respective and co-related functions to the best advantage. Another object of the invention is the provision of means for maintaining the fastener-clip in proper association with the companion die and punch adapted to act on it while the metal-strap extended through the clip or holder is being drawn taut and at the same time sliding through the clip. Furthermore, another advantage from the use of the invention resides in employing an improved form of strap-clamp which will hold an end portion of the band or strap in proper position relative to the metal fastening clip and the deforming die and punch and at the same time permit the passage through the clamp of another or overlying section of the strap.

Of course, as a further advantage I aim to provide a device of this general character which is simple in structure, easy to operate, economical to manufacture, and unlikely to become broken or otherwise injured in service.

To those skilled in this art the attainment of these and other desirable objects will be found in the preferred embodiment of the invention described in detail below and illustrated in the accompanying drawings forming a part of this specification and throughout the various views of which reference characters refer to the same parts.

In these drawings:

Figure 1 is an elevation of the improved and novel device showing its association with a flat metal band and its fastener-clip;

Figure 2 is a plan view of the structure, the band and clip being omitted and the stretcher operating handle being cut away;

Figure 3 is an end elevation on an enlarged scale of the appliance with the punch-handle cut off and a portion of the structure shown in vertical section;

Figure 4 is an enlarged vertical section on line 4—4 of Figure 3;

Figure 5 is a face view of a portion of the overlapped sections of the metal band and their associated clip showing these parts after having been operated upon by the punch and die; and

Figure 6 is an edge view of the elements shown in Figure 5.

From these drawings it will be apparent that this particular embodiment of the appliance comprises a body 10 recessed or cut away at its top at 11, Figure 2, for the reception of the end portion of a combination ratchet-bar and handle 12 equipped for a portion of its length on its top face with transverse ratchet-teeth 13 and provided at its end with a supporting lug or foot 14 (Figure 1). Also depending from such member is a projection 15 acting to support one end of a round rod 16 the other end of which is seated and secured in a cavity in body 10. Reciprocatory on such rod and straddling the ratchet-bar is a block 17 guided and prevented from sidewise displacement by both elements 10 and 16. A clamp plate or bar 18 is fastened by means of screws to the bottom of such slidable block and projects sidewise or forwardly

therefrom, and above this plate or ledge and rockingly mounted on a shaft 19 supported in an overhanging part of the block, I provide an eccentric or cam clamp 20 equipped with an upstanding operating handle 21. Thus it will be clear that the flat metal band or strap 70 to be made tense or taut may be securely clamped between the parts 18 and 20, the upper surface of the former being roughened, if desired, for more firm and secure engagement with the band.

A slidable rack-bar 22 is disposed above and overlies the ratchet-bar 13 and is recessed on its under face to straddle or extend over the ratchet-teeth, edge portions 23, 23 of the rack-bar riding and sliding on the longitudinal flat sections 24, 24 of part 12 not equipped with ratchet-teeth, the latter extending only part way across the upper face of bar 12. To operate this rack I provide a gear-sector or mutilated-gear 25 fulcrumed on a fixed shaft 26 supported in upstanding ears 27, 27 of block 17 and supplied with an operating handle 28 preferably integral or rigid therewith.

Coacting with the ratchet-teeth are two companion pawls, one 29 hinged at 30 on a terminal part of the rack, the other 31 an inverted U-shaped member straddling the ratchet-bar and coöperating with its teeth but hinged below the bar to the reciprocatory block 17 at 32, 32. Thus these pawls or dogs when in coöperative relation with the ratchet-bar permit the rack and block to travel to the right, as the parts are viewed in Figure 1, but prevent their movement in the opposite direction.

Fastened to the bottom of the body 10 by screws 33 I employ a combined die and clamp plate 34 of reduced thickness in that part which is in alignment with plate 18 to provide a substantial space 35 between the top face of such thinner portion and the bottom surface of the overhanging section of body 10. Also the lateral edge of the plate is beveled at 36 to facilitate the entrance of the strap or band and its clip or fastener into the recess 35.

The appliance includes additionally above the roughened or knurled part 37 of plate 34 a second eccentric or cam clamp 38 accommodated in a recess 39 in the body 10 and fixed to a shaft 40 having a limited vertical play by reason of being received in upright slots 41 in the main element 10. This cam or eccentric is equipped with a handle 38^a similar to the handle 21 and with an anti-friction roller 44 projecting slightly beyond its periphery and adapted to engage directly the upper surface of the metal strap or band. Shaft 40 and such eccentric clamp are pressed down toward the clamp-plate 34 by a pair of coil springs 42 in suitable holes in the member 10 which apertures are equipped with screws 43, 43 above the ends of the springs by means of which the pressure of the springs on the shaft may be regulated or adjusted.

The combination die-block and clamp-plate has a straight groove 45 cut in its top face and above this the part 10 is equipped with a vertically reciprocatory punch 46 guided in its movements by the body 10 itself and a plate 47 fastened thereto. Such punch on its bottom face has two opposed teeth 48 and 49 with oppositely sloped or inclined inner surfaces 50, 51 adapted to enter the die-block groove. The metal strap or band is properly positioned with respect to the die and punch when its inner edge bears against the shoulders 52, 53 of the die-block and the metal-clip associated with the superposed parts of the band is adapted to be received in small part in a cavity 72 rearwardly of and between the shoulders 52 and 53, the parts of the block provided with such spaced shoulders preventing lengthwise movement of the clip, that is, movement transverse to the die-block groove.

To depress the toothed punch 46 with an adequate degree of pressure but with an expenditure of small manual effort the following instrumentalities are provided. Element 10 has a pair of parallel, spaced, upright walls 54 and 55 connected together at their top ends by a removable cross-plate 56 equipped centrally with an aperture receiving the screw-threaded shank 57 of a support 58 to which a toggle-link 59 is pivoted at 60, the companion toggle-link 61 being hinged to the first link on a knuckle-pin 62 and to the sliding punch at 63. The part 57 is adjustably held to the bar or plate 56 by nuts 100 and 101 bearing against the top and bottom faces of the bar 56 as is clearly shown. Obviously, by turning or adjusting the position of these nuts the height of the member 56 may be regulated and the action of the toggle controlled. Pin 62 by a pair of spaced links 64 is pivotally connected at 65 to the short arm 66 of a bell-crank lever, the other or long arm 67 of which constitutes a convenient operating handle. Such bell-crank lever is fulcrumed on a cross pin 68 supported in extensions 69, 69 of the walls 54 and 55.

The operation of the appliance occurs practically in the following manner. A section 70 of the flat metal band or strap comes from a supply-roll or spool (not shown) and extends between the clamp members 18 and 20, then between the companion holding elements 34 and 38, then around the body or container to be bound or strapped, thence beneath the plate 18, and then over the die-block 34 beneath the other part of the strap, terminating shortly beyond the die-block as shown in Figure 1. These overlapped band or strap sections beneath the punch are fitted with a confining bent metal clip or fastener 71 of

suitable shape through which the upper one is adapted to slide, the clip being held from substantial or material longitudinal displacement by having its inner edge portion received between the two shoulders 52 and 53 in the rearward cavity 72. Assume now that both eccentric clamps are tightened by turning the handles 21 and 38[a], then the parts 18 and 20 will firmly grip the single strand or thickness of the band leading from the supply-roll and the parts 34, 38, and 44 will grasp the double thickness or superposed portions of the metal strap. When the latter clamp is tight, the handle 38[a] will be against the plate 56 acting as a stop to prevent further turning in that direction, and the axis of the anti-friction roller 44 will be directly beneath the axis of shaft 40, the roller being pressed down to its work solely by the pair of springs 42 which have been adjusted by screws 43 to give the proper pressure on the underlying overlapped strap sections. Owing, however, to the use of the roughened surface 37 bearing against the bottom face of the lower section of the strap and the employment of anti-friction roller 44, the upper section of the strap may be pulled to the right (Figure 1) by the travel of block 17 in that direction, thus tightening the strap around the body which it encircles, the under part of the strap being firmly held against movement. By rocking handle 28 to the right and left several times the block 17 and the rack-bar 22 are caused to travel alternately and intermittently to the right being restrained by their respective pawls from moving to the left. In this way the superposed length of the strap is tightened slipping or sliding over the under one in the clamp 34, 38, 44 and through the clip 71 held against movement. When the metal band or tape has been drawn sufficiently taut and while such strap is still held in this tense condition by the clamping appliance, the operator depresses handle 67 thus straightening or increasing the effective length of the toggle and forcing the punch downwardly. This by coaction with the edges or walls of the die groove cuts parallel spaced slits 72, 72 in the opposite edges of the two thicknesses of the metal strap and also in the encasing metal clip 71 and at the same time the beveled faces of its cutting or shearing teeth force the tongues or strips of metal 73, 73 between the slits down into the die groove hence deforming these portions of the strap and clip and securely interlocking them together and against the possibility of unfastening or separation in service. The punch is now raised, the clamping devices released, and the appliance shifted sidewise or rearwardly away from the strap, which can now be cut off or severed near the fastener from that portion leading to the supply-roll.

Those skilled in this art understanding the construction and operation of this appliance will perceive that the invention in its broad aspect is not limited and restricted to this particular embodiment, but is susceptible of a variety of material representations and that many minor mechanical changes may be made in the structure shown and described without departure from the heart and essence of the invention and without the sacrifice of any of its substantial benefits and advantages.

I claim:

1. In an appliance of the character described, the combination of means to clamp a metal strap, a second means to press overlapped parts of the strap together face to face, means to lengthen the distance between said clamping means and said pressing means to tighten the strap, means to deform the overlapped parts of the strap and an encasing clip to secure them together, said pressing means being independent of said clip and pressing said overlapped parts together and simultaneously securely holding one strand of the strap and permitting the other strand to slide therethrough.

2. In an appliance of the character described, the combination of a clamp-plate, a clamp-member, a handle to operate said clamp-member, anti-friction means on said clamp-member adapted to engage a face of one strand of overlapped parts of a metal strap, the other strand resting on said clamp-plate, and means to pull the strand against which the anti-friction means bears, the companion strand being held from movement by the clamp plate and the pressure of the superposed strand, substantially as described.

3. In an appliance of the character described, the combination of a clamp-plate, a clamp-member, a handle to operate said clamp-member, anti-friction means on said clamp-member adapted to engage a face of one strand of overlapped parts of a metal strap, the other strand resting on said clamp-plate, adjustable spring means acting on said clamp-member pressing it toward said clamp-plate, and means to pull the strand against which the anti-friction means bears, substantially as described.

4. In an appliance of the character described, the combination of a clamp-plate, a co-operating clamping means comprising a shaft, a mounting for said shaft permitting the latter to move bodily toward and from said clamp-plate, a clamping element on said shaft, an anti-friction roller on said element adapted to engage one strand of a pair of overlapped parts of a strap, a handle to turn said shaft, a spring acting on said shaft pressing it toward said clamp-plate, and means to adjust said spring, and means to pull taut the strap strand against which the anti-friction roller bears, the companion strand being held against movement

between said clamp-plate and the other strap strand, substantially as described.

5. In an appliance of the character described, the combination of a roughened clamp-plate, a co-operating clamping means comprising a shaft, a slotted mounting for said shaft permitting the latter to move bodily toward and from the clamp-plate, a clamping element on said shaft, an anti-friction roller on said element adapted to engage one strand of a pair of overlapped parts of a strap, a handle to turn said shaft, a spring acting on said shaft pressing it toward said clamp-plate, and means to adjust said spring, and means to pull taut the strap strand against which the anti-friction roller bears, the companion strand being held against movement between said clamp-plate and the other strap strand, substantially as described.

6. In an appliance of the character described, the combination of a roughened clamp-plate, a co-operating clamping means comprising a shaft, a slotted mounting for said shaft permitting the latter to move bodily toward and from said clamp-plate, an eccentric clamping element on said shaft, an anti-friction roller on said element adapted to engage one strand of a pair of overlapped parts of a strap, a handle to turn said shaft, a spring acting on said shaft pressing it toward said clamp-plate, and means to adjust said spring, and means to pull taut the strap strand against which the anti-friction roller bears, the companion strand being held against movement between said roughened clamp-plate and the other strap strand, substantially as described.

SAMUEL J. TURNER.