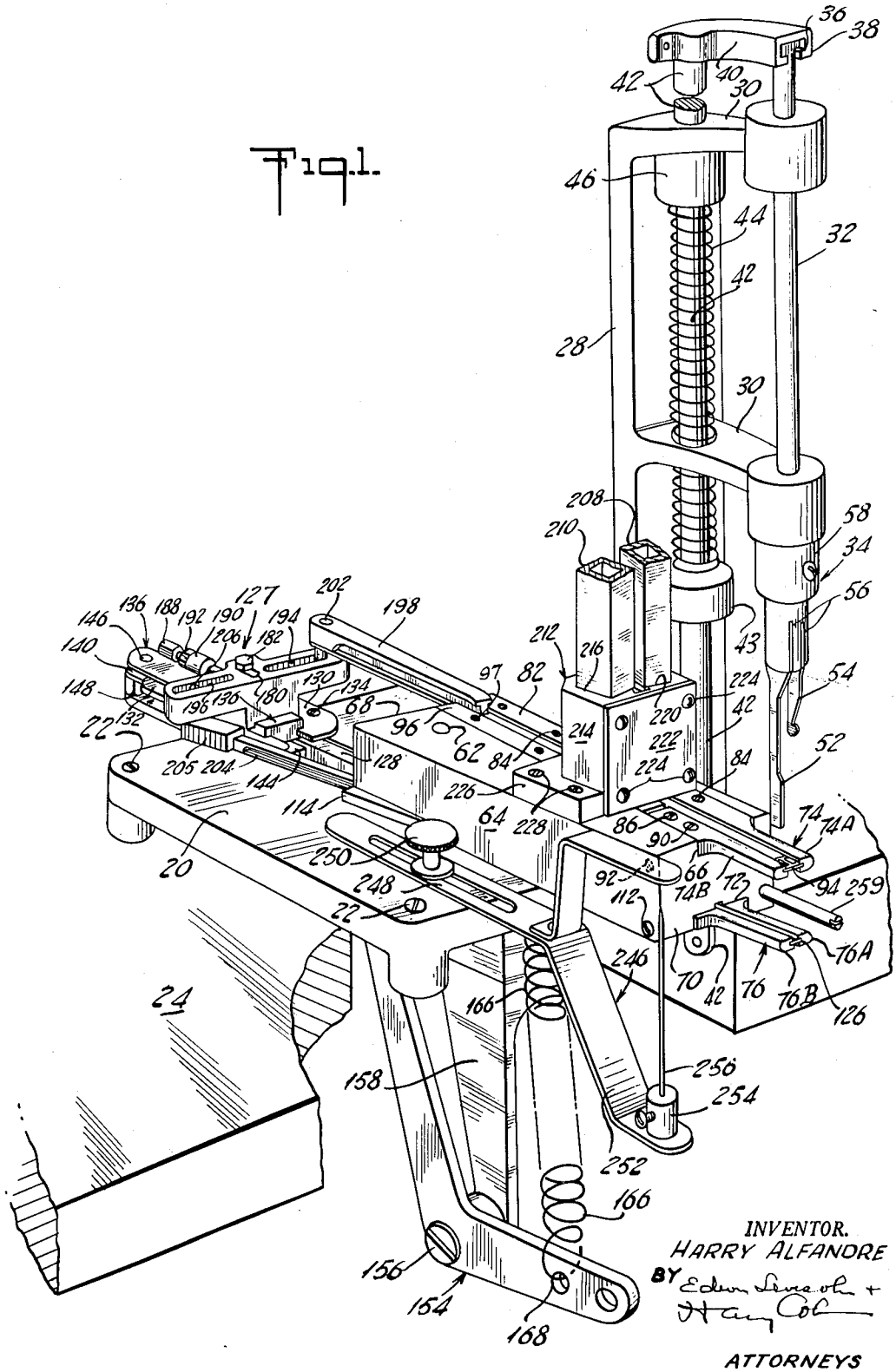
Dec. 27, 1955 H. ALFANDRE 2,728,497

STRAP AND BUCKLE ASSEMBLING APPARATUS

Filed Feb. 12, 1953 5 Sheets-Sheet 1

Fig. 1.



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STRAP AND BUCKLE ASSEMBLING APPARATUS

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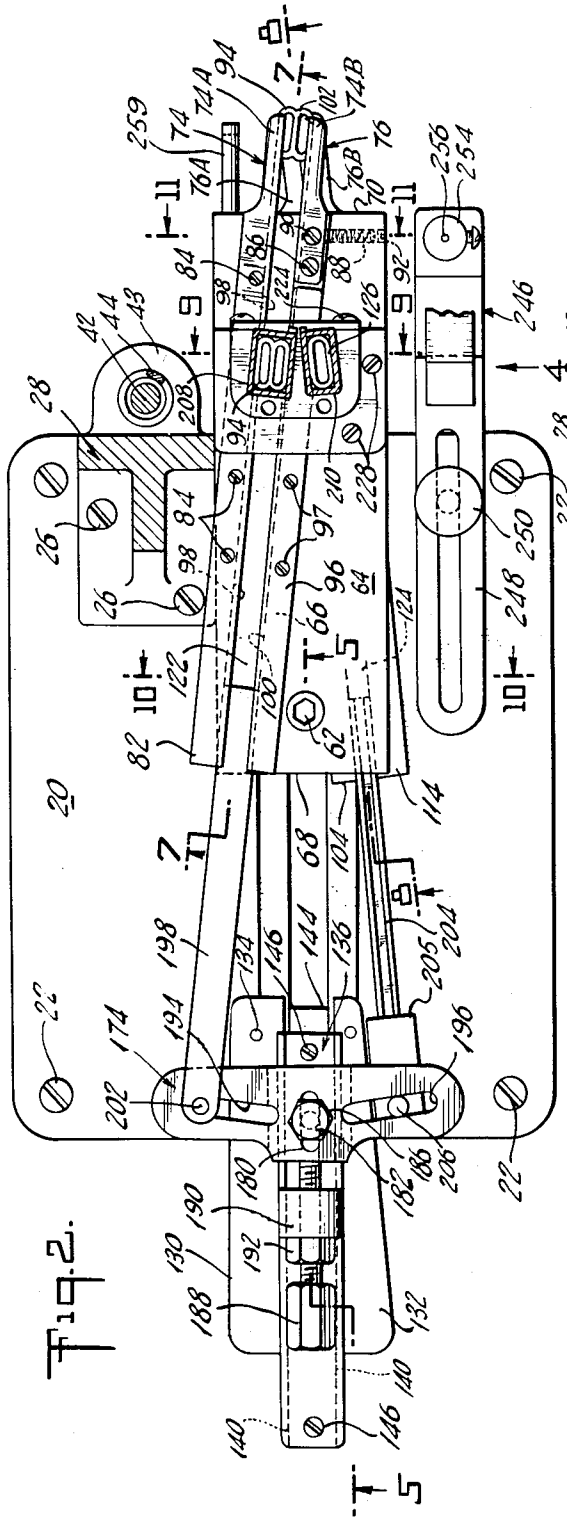


Fig. 2.

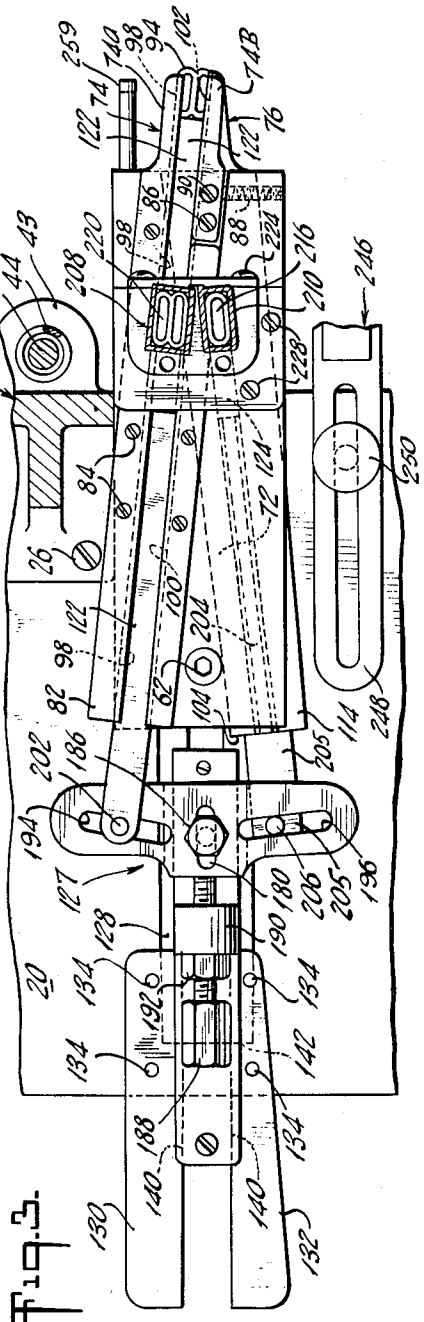


Fig. 3.

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STRAP AND BUCKLE ASSEMBLING APPARATUS

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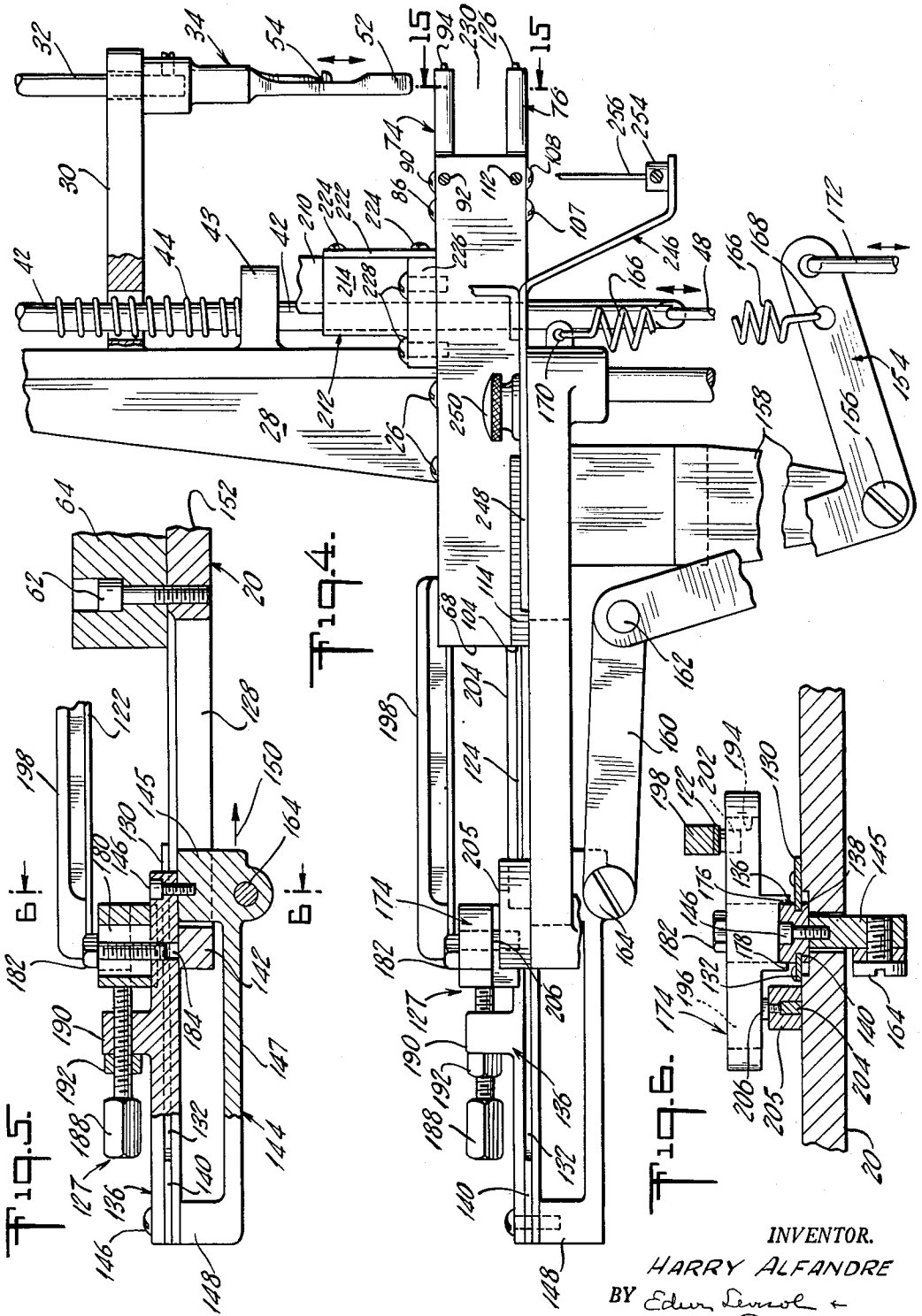


Fig. 4.

Fig. 5.

Fig. 6.

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STRAP AND BUCKLE ASSEMBLING APPARATUS

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Fig. 7.

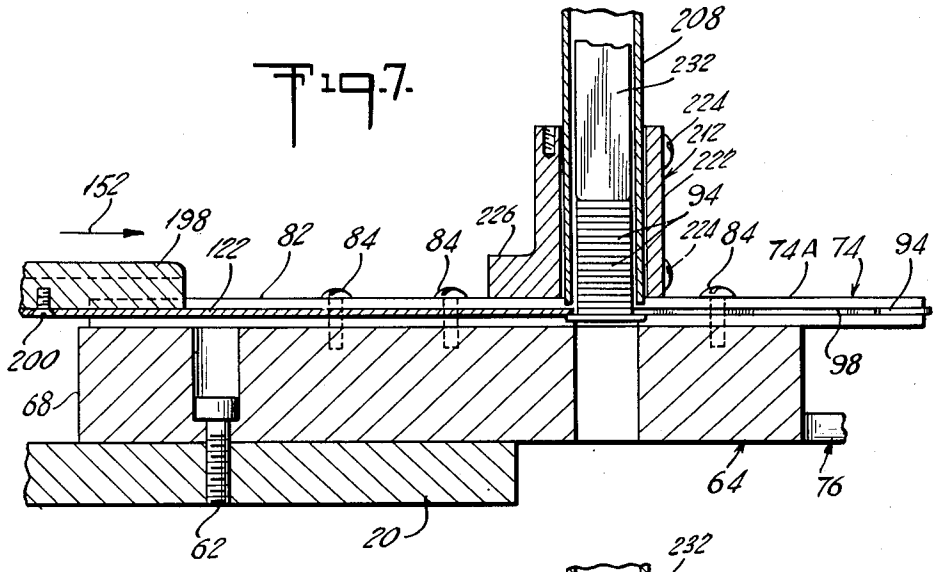


Fig. 8.

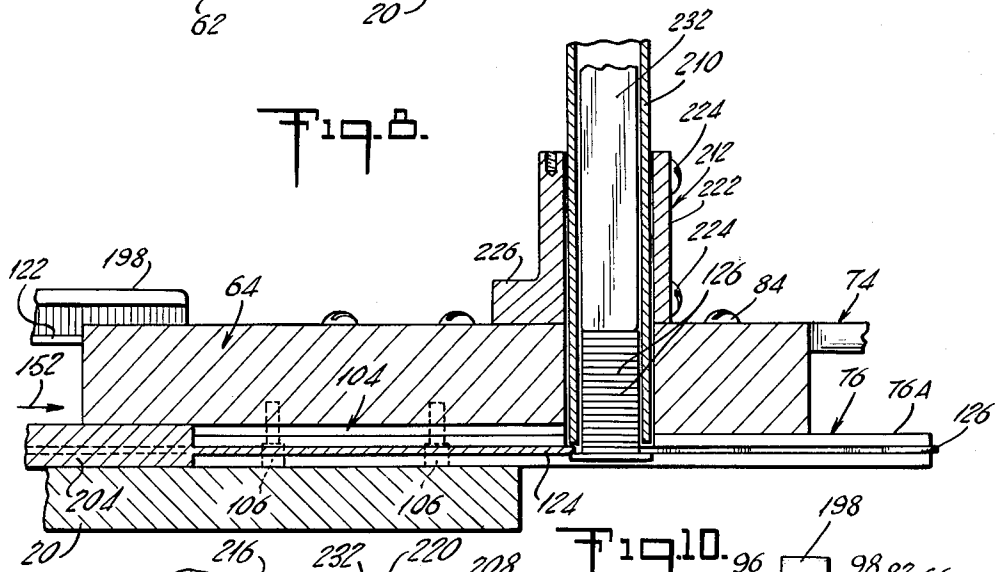


Fig. 9.

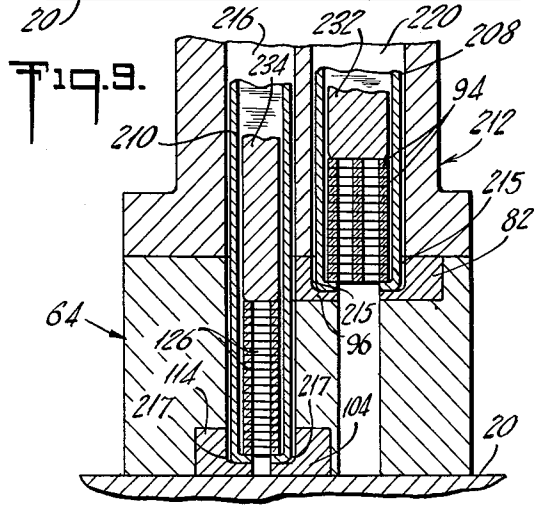
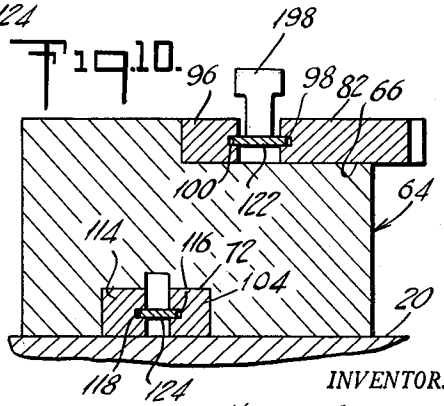


Fig. 10.



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STRAP AND BUCKLE ASSEMBLING APPARATUS

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Fig. 11.

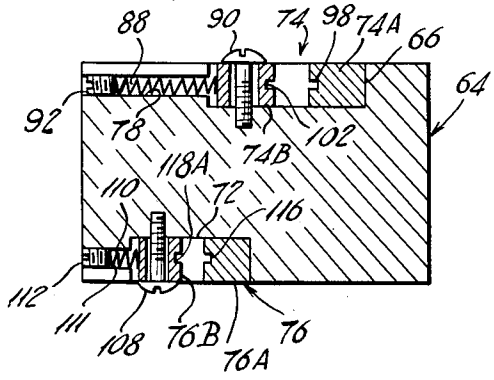


Fig. 12.

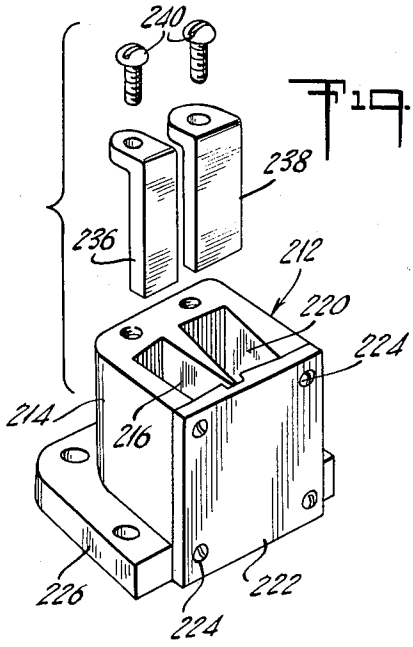


Fig. 13.

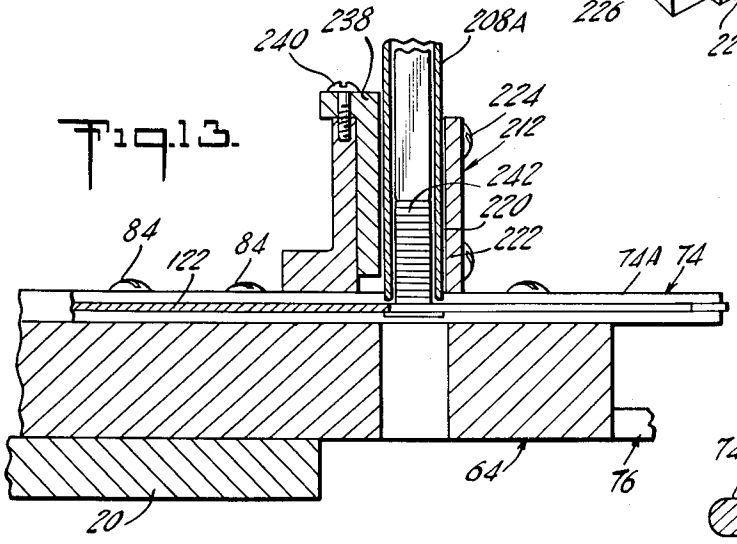


Fig. 15.

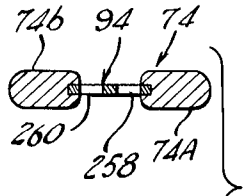
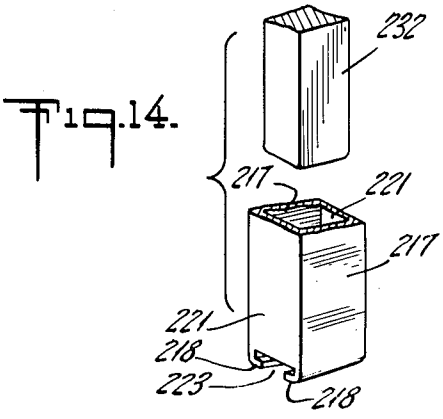
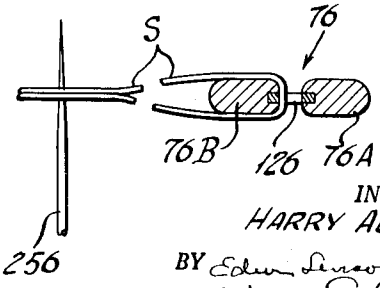


Fig. 14.





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United States Patent Office

2,728,497

Patented Dec. 27, 1955

2,728,497

STRAP AND BUCKLE ASSEMBLING APPARATUS

Harry Alfandre, Jamaica, N. Y.

Application February 12, 1953, Serial No. 336,605

9 Claims. (Cl. 223—49)

This invention relates to apparatus for assembling buckles and straps in the manufacture of adjustable straps. The apparatus is intended primarily for use in the manufacture of adjustable shoulder straps of the type extensively utilized in ladies' undergarments, but may be used generally for the manufacture of adjustable straps. More particularly, the present invention resides in improvements upon the apparatus shown and described in my prior Patent No. 2,091,176, dated August 24, 1937, and in the apparatus shown and described in my prior Patent No. 2,526,187, dated October 17, 1950.

In the apparatus disclosed in each of my prior patents, a separate holder was required for each buckle magazine. One holder was mounted on the upper side or surface of a guide block and the other holder was mounted on the lower side or surface thereof. A plunger operated in said guide block between said holders to discharge the buckles from each of the magazines. While the feed from the upper magazine was of the gravity type, being augmented by a weighted bar, the feed from the lower magazine depended upon a spring urged plunger which was provided with an elongated stem about which the spring was disposed. The spring biased the plunger for upward movement and when the magazine was filled substantially to capacity, the plunger was in its maximum retracted or lowermost position and, therefore, subject to maximum spring pressure. This resulted in a tendency, at times, for the plunger to bend slightly from a vertical plane. This caused the buckles in the lower magazine to tilt or be displaced from a horizontal plane so as to interfere with the proper feed thereof from said lower magazine. Accordingly, it is a primary object of the present invention to eliminate any such tendency of the buckles to be displaced from proper feeding disposition thereof.

Another object is the provision of means to feed a pair of companion buckles from the upper surface of a guide block, whereby to provide a positive feed for both buckles.

A further object is the provision of a single holder means in which both of the magazines are disposed.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a perspective view of the apparatus embodying the present invention with parts thereof broken away;

Fig. 2 is a plan view of said apparatus with parts thereof illustrated in section and with the buckle-feed mechanism disposed in the retracted position thereof;

Fig. 3 is a view similar to Fig. 2 with the buckle-feed mechanism in the projected position thereof;

Fig. 4 is a fragmentary side elevation, as viewed in the direction of the arrow 4 in Fig. 2, with parts broken away and parts in section;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is a sectional view, on a larger scale, taken on the line 7—7 of Fig. 2;

Fig. 8 is a sectional view, on a larger scale, taken on the line 8—8 of Fig. 2;

Fig. 9 is a sectional view, on a larger scale, taken on the line 9—9 of Fig. 2;

Fig. 10 is a sectional view, on a larger scale, taken on the line 10—10 of Fig. 2;

Fig. 11 is a sectional view, on a larger scale, taken on the line 11—11 of Fig. 2;

Fig. 12 is an exploded view of a magazine holder pursuant to the present invention and inserts therefor;

Fig. 13 is a view similar to Fig. 7 showing an insert in position in the magazine holder;

Fig. 14 is an exploded view of a buckle magazine and feed bar therefor, with portions broken away; and

Fig. 15 is a sectional view taken on the line 15—15 of Fig. 4.

Referring to the drawings in detail, the reference numeral 20 designates the bed plate of the instant apparatus which is suitably secured, as by screws 22, to a bench or work table 24. Suitably mounted, as by the screws 26, on the bed plate 20 is an upright bracket or standard 28, having laterally extending arms 30 in which a bar 32 is vertically slidable. Bar 32 carries at its lower end a strap threading device 34, to be hereinafter described in detail, and has a T-shaped upper end 36 which is inserted in a guide groove 38 in an arm 40 on a rod 42 for preventing relative rotation of the rod 32 and the arm 40. Rod 42 is mounted for movement relative to the bracket arms 30 and a guide part 43. Said rod is normally urged by a compression spring 44 into the uppermost position thereof, illustrated in Fig. 1, in which an adjustable collar 46 thereon bears against one of the bracket arms 30, the spring being mounted between said collar and part 43. The lower end of rod 42 is connected by a link 48 (Fig. 4) with a suitable foot pedal not shown herein but which is illustrated in both of my prior patents, which, when depressed by an operator, causes lowering of the rod 42 and corresponding lowering of the strap threading device 34 into operative position. The strap threading device 34 comprises a blade 52 and a hook 54, both being removably clamped into slots 56, respectively, in a head 58 on the lower end of bar 32, as best illustrated in Fig. 1.

Suitably mounted on the bed plate 20, as by the bolt 62 is a block 64, as best illustrated in Fig. 5. In the upper surface thereof, the block 64 is provided with a recess or seat 66 which extends diagonally inwardly from the rear end 68 of the block toward the front end 70 thereof, as best shown in Figs. 1, 2, 10 and 11. In the lower surface thereof, the block is provided with a recess or seat 72 (Figs. 1, 3, 10 and 11) which extends diagonally inwardly from the rear end 68 of the block toward the front end 70 thereof, but in relative converging relation to the recess 66, so that said recesses will be in superimposed relation at the front of the block, as best illustrated in Fig. 1. At the front 70 of the block and projecting therefrom the recess 66 mounts the pair of relatively movable jaws 74, and the recess 72 mounts the pair of relatively movable projecting jaws 76. The jaws 74 are constituted by the stationary jaw 74A and the companion movable jaw 74B. The jaw 74A is integral with and constitutes the forward portion of a guide 82 which is secured in the recess 66, as by the screws 84. The companion jaw 74B is mounted for pivotal movement at the screw 86, and it is normally biased toward the companion jaw 74A by the spring 88 provided in the block 64, as best illustrated in Fig. 11, the screw 90 extending through the jaw 74B into the block 64, to limit the pivotal movement thereof. It

will be noted that the spring **88** has one end thereof in abutment with the jaw **74B** and the other end thereof in abutment with a screw **92** threaded into the spring bore **78** of the block **64**. Fig. 2 illustrates the open position of the jaws **74** with a double eyelet buckle **94** therebetween. However, it will be understood that in the closed condition thereof, the distance between the jaw members **74A** and **74B** is less than the width of said double buckle **94**, the jaw **74B** pivoting to receive said buckle. Rearwardly of the pivotally movable jaw **74B**, the block **30** is provided with a guide member **96** which is secured in the recess **66**, by the screws **97**, and which cooperates with the previously mentioned guide member **82**, as hereinafter described in detail. It will be noted from Fig. 10 that the guide members **82** and **96** are longitudinally grooved at their confronting surfaces, as at **98** and **100**, respectively. The groove **98** extends into the stationary jaw **74A**, as illustrated in Figs. 7 and 11, and the companion pivotally movable jaw **74B** is provided with a similar groove **102** (Fig. 11) which is in alignment with the previously mentioned groove **100** in the guide member **96**. From the foregoing, it will be understood that the groove **98** and the aligned grooves **100** and **102** cooperate to form a track or guideway which extends from the rear to the front of the block **64** at the upper surface thereof.

The pair of jaws **76** at the lower surface of the block are constituted by the stationary jaw **76A** and by the pivotally mounted jaw member **76B**. The stationary jaw **76A** comprises the forward end of a guide member **104** (Fig. 8) which is mounted, as by the screws **106**, in the lower recess **72** in the block, said guide member being substantially similar to the previously mentioned guide member **82**. The companion movable jaw **76B** is pivotally mounted in the lower recess **72** by a screw **107** (Fig. 4). A screw **108** extends through the jaw **76B** and into the block **64** to limit pivotal movement thereof, as best illustrated in Fig. 11. A spring **110**, provided in the block bore **111**, between the screw **112** and the jaw **76B**, biases the latter to abut the stationary jaw **76A** in the closed condiiton of said jaws. A guide member **114** (Figs. 1, 2, 9 and 10) is disposed in the lower recess adn extends therein rearwardly of the movable jaw member **76B**. At their confronting surfaces, the guide member **104** is longitudinally grooved, as at **116**, and the companion guide member **114** is longitudinally grooved, as at **118**, it being understood that said grooves together cooperate to form a track or guideway. As in the case of the upper jaws **74**, the groove **116** in the guide member **104** extends into the stationary jaw **76A**, and the companion movable jaw **76B** is grooved, as at **118A**, and said groove is aligned with the groove **118** of the guide member **114**.

The track **98—100** accommodates a feed slide member or plunger **122** for ejecting the double eyelet buckle **94**. The track **116—118** accommodates a feed slide member or plunger **124** for ejecting the single eyelet buckle **126**.

In order to effect reciprocation of said slides, provision is made for a reciprocating carriage, generally indicated at **127**. In order to accommodate the carriage the bed plate **20** is slotted, as at **128** (Fig. 5) and provided with the spaced guide members **130** and **132** which are secured thereto, as at **134**, and which constitute a continuation of the slot **128**. The carriage **127** comprises a holder member **136** which is grooved longitudinally thereof, at each of the opposite sides thereof, as at **138** and **140**, to provide tracks for the guide members **130** and **132**, respectively, as best seen in Fig. 6. It will be noted that the slot **128** is closed at one end thereof by a portion **142** of the bed plate, as best illustrated in Fig. 5, and at the other end thereof by a portion **152** of the bed plate. The previously mentioned guide members **130** and **132** overlie the portion **142** of the bed plate and extend outwardly thereof. The holder **136** is provided with an underlying U-shaped part **144** having the spaced arms **145** and **148**. Bolts **146** secure said arms to the member **136**. Arm **145** rides in the closed slot **128**. Said part **144** has a base portion **147** which underlies the previously mentioned portion **142** of the bed plate **20**. From the foregoing, it will be understood that movement of the carriage **127** in the direction of the arrow **150** in Fig. 5 is limited by the engagement of the arm **145** with the bed plate portion **152** and that movement thereof in the opposite direction is limted by engagement thereof with the bed plate portion **142**, as illustrated in Fig. 5. Further it will be understood that during the entire movement of the carriage to and from the retracted position thereof, illustrated in Fig. 2, to and from the projected position thereof, illustrated in Fig. 3, the tracks **138** and **140** of the holder ride on the guide members **130** and **132**.

In order to effect said reciprocation of the carriage, provision is made for a bell crank lever **154**, best illustrated in Figs. 1 and 4, which is pivotally mounted, as at **156**, to a bracket **158** at the underside of the bed plate **20**. As best illustrated at Fig. 4, a link **160** has one end thereof pivotally connected to the bell crank lever, as at **162**, and the other end thereof is pivotally connected to the member **144** of the carriage, as at **164**. A coiled spring **166** interconnects the bell crank lever, as at **168**, and a lug **170** carried by the bed plate for returning the carriage **127** to the retracted position thereof. A link **172** interconnects the bell crank lever and a suitable foot pedal, not shown herein but which is fully illustrated and described in both of my prior patents, for operating the bell crank lever against the bias of the spring to move the carriage from the retracted position thereof to the projected position thereof, the carriage being returned to said retracted position by contraction of the spring **166** which expands upon operation of the foot pedal.

In order to effect the reciprocation of the previously mentioned buckle feed bars **122** and **124**, the holder **136** of the carriage is provided with a yoke **174** which yoke **174** straddles the holder part as at **176** and **178**, as best illustrated in Fig. 6. In order to adjustably mount the yoke on the holder part, the yoke is provided with the elongated slot **180** through which there extends a threaded locking bolt **182** which is secured in the part **136**, as at **184** in Fig. 5. A washer **186** is interposed between the yoke and the head of the bolt **182**. In order to adjust the yoke relative to the member **136**, provision is made for the adjusting screw **188** which is mounted in the upstanding part **190** of the holder **136**. The adjustment is accomplished by backing up the bolt **182**, and then rotating the member **188** in a direction to move the yoke closer to the previously mentioned jaws **74** and **76** for positioning the feed bars carried thereby, closer to the respective jaws. In order to then retain the yoke at the adjusted position thereof, the locking bolt **182** is threaded into position and the nut **192** is threaded against the upstanding part **190**.

It will be noted that the yoke is provided with the oppositely extending diagonally directed slots **194** and **196**. The feed bar **122** is carried at the underside of an arm **198**, being secured thereto by screws **200** (Fig. 7). Said arm is provided with a depending roller **202** (Fig. 6) which is disposed within the slot **194**. The feed bar **124** extends from an arm **204** in which it is suitably secured and said arm is provided with an enlarged part **205** carrying a roller **206** which extends into the slot **196**. From the foregoing, it will be understood that the rollers converge in the slots as the carriage moves to the projected position thereof, as illustrated in Fig. 3, and that said rollers diverge in said slots during movement of the carriage to the retracted position thereof, as illustrated in Fig. 2.

Supply stacks of the double eyelet buckles **94** and the single eyelet buckles **126** are provided in tubular magazines **208** and **210**, respectively. Pursuant to the present invention, said magazines are mounted in side-by-side disposition at the upper side of the block **64**, by a common holder or mount **212**. As best illustrated in Fig. 12, said holder comprises the casting **214** having the verti-

cally extending notches **216** and **220** which are closed at their sides by the plate **222** secured to the casting as at **224**. The casting is provided with the apertured flange **226** for securing the latter on the block **64**, as by the screws **228**. As will be noted from Figs. 2 and 3, the notch **216** is narrower than the notch **220**. The notch **216** accommodates the magazine **210** for the single eyelet buckles and the notch **220** accommodates the magazine **208** for the double eyelet buckles. Referring now to Fig. 9, it will be noted that the companion guide members **82** and **96** are recessed, inwardly of the upper jaws **74**, as at **215—215**, in order to accommodate the magazine **208**, which extends through the block **212**, said recesses forming a seat for the discharge end of the magazine. Similarly, the companion guide members **104** and **114** are recessed, as at **217—217**, to form a similar seat for the discharge end of the magazine **210** which extends through the block **212**.

The discharge end of each magazine may be constructed as shown in Fig. 14. Thus, two opposite side walls **217—217** of either magazine may be provided at the discharge end with inwardly bent opposite ledges **218—218** which retain the stacked buckles in the magazine, and which are spaced from the adjacent ends of the other side walls **221—221** of the magazine to provide a discharge gate **223** through which the foremost buckle may be removed edgewise. As best illustrated in Fig. 7, the discharge gate in the magazine **208** is in alignment with the feed bar **122** when the magazine is in the operative position thereof. Similarly, the discharge gate in the magazine **210** is aligned with the feed bar **124** when the latter magazine is in the operative position thereof, as best illustrated in Fig. 8. In order to retain each of said magazines in the operative position thereof, against withdrawal outwardly from the block **212**, it will be noted from Figs. 7 and 8, that in the retracted position of the carriage, each feed bar extends slightly into the gate of the companion magazine to partially overlie the ledges **218—218** of the magazine. It will be understood that the yoke **174** is retracted relative to the holder **136**, in the retracted position of the carriage, to withdraw both of the feed bars from the position thereof indicated in Figs. 7 and 8, to permit for the insertion or removal of the magazines from the holders. As previously indicated, this is accomplished by backing up the locking bolt **182** to release the yoke for movement relative to the holder **136** and by backing up on the adjusting screw **188** to permit for said relative movement.

From the foregoing, it will be apparent that the respective notches **216** and **220**, when closed by the plate **222**, form sockets for receiving the rectangular magazines. Said magazines fit in their respective sockets only if so disposed that the discharge gate of magazine **208** is in alignment with, and forms a continuation of the tracks extending from the upper guide members **82** and **96** through the jaws **74**, and the discharge gate of magazine **210** forms a continuation of tracks extending from the lower guide members **104** and **114** and through the jaws **76**. If so disposed, the foremost buckles in the magazines **208** and **210** are in the path of the feed bars **122** and **124**, respectively, and are transferred by said feed bars from their respective magazines into the tracks of the jaws **74** and **76**, to an assembly station generally, indicated at **230** in Fig. 4. At said assembly station, said foremost buckles are in operative alignment with the strap threading device **34**, vertically below the latter, and as indicated in Fig. 15, the eyelet in the lower buckle **126** is in vertical alignment with one of the eyelets in the upper buckle **94**.

In order to assure that the buckles in each of the magazines advance towards the discharge end thereof every time a buckle is removed therefrom by the companion feed bar, the gravity of the stacked buckles is augmented by that of a bar **232** or **234**, as the case may be, which fits into the upper end of the magazine and rests on the buckles therein, in the fashion shown in Fig. 9. Said bars are preferably made of solid metal stock.

As in my prior Patent No. 2,526,187, provision is made herein to adapt the apparatus for the assembly of straps and buckles of different sizes, without involving a complicated interchange of numerous parts, or requiring a skilled mechanic. In this connection, provision is made for the inserts **236** and **238** (Figs. 12 and 13) that are removably mounted by screws **240** on the magazine holder **212** for the purpose of sizing the notches **216** and **220**, respectively, for fittedly receiving magazines that are of narrower widths longitudinally of the respective feed bars than the magazine **208** and **210**, respectively, in the manner fully described in said prior patent. One of said magazines for a double-eyelet buckle is illustrated at **208A** in Fig. 13. In this manner, provision may be made for assembling a strap with buckles which are narrower or smaller than the previously mentioned buckles, for example, the double-eyelet buckles which are indicated at **242**. The inserts are readily removable to hold the magazines for the larger buckles, as illustrated in Fig. 9.

A holder **246** for adjustable straps is mounted on the bed plate **20** of the apparatus, and comprises a bracket having a slotted portion **248** for engagement with a screw **250** by which said bracket may be adjustably secured in position, and a downwardly turned portion **252** which carries a socket **254** for a needle **256** on which the ends of the assembled straps may be impaled.

In using the present apparatus for the purpose of assembling a pair of buckles with straps and forming an adjustable loop in one of the straps, and assuming that the magazines are mounted in the apparatus as shown in Fig. 9, a double eyelet buckle **94** and a single eyelet buckle **126** are transferred from the magazines **208** and **210**, respectively, to the described assembly station in their respective jaws **74** and **76**, by depressing a pedal which depresses the link **172**, as illustrated and described in both of my previously identified patents, whereby to operate the bell crank lever **154** for advancing the carriage from the retracted to the projected position thereof to accordingly advance the feed bars **122** and **124** from the respective positions thereof illustrated in Figs. 2, 7 and 8 to the positions thereof illustrated in Fig. 3. A strap section S (Fig. 15) is then placed over the lower jaws **76** and the rod **259** (Fig. 1), and more particularly over the opening in the buckle **126** held by said jaws whereupon the other pedal is depressed in order to cause the blade **52** to engage the strap section S and force it through the opening in the buckle **126**, as fully illustrated and described in said prior patents. The ends of the strap section S, which have been in this manner looped through the buckle **126**, are then impaled on the needle **256** in the manner shown in Fig. 15, so that the intermediate folded portion of the strap section S is held to one side of the opening in the buckle **126**. Another strap section S', not shown herein but which is fully illustrated and described in both of said prior patents, is then threaded through the opening **258** of the buckle **94**. To accomplish this, the strap section S' is first positioned below the top jaw **74** so as to be threadable through the buckle opening **258** by the hook **54**. Thus, by lowering the bar **32** on depression of the associated pedal, the hook **54** is projected through the eyelet opening **258** in the buckle **94**, and by positioning the strap section S' so that the same is over the free end of the lowered hook, subsequent upward movement of the bar **32** on release of the associated pedal causes the hook to move the strap sections S' through the buckle opening **258**. A suitable length of the strap section S', thus threaded through the opening **258** in the buckle **94**, is positioned over the latter, after which the blade **52** is lowered into engagement with said overlying strap length and forces the latter through the other eyelet opening

260 in the buckle 94 and also through the eyelet opening in the lower buckle 126. The portion of the strap section S' thus passed through the opening in both buckles 94 and 126 is again threaded through the buckle opening 258 in the same way as before by means of the hook 54, and is again disposed in overlying relation with respect to the other opening 260 in the buckle 120. Finally, the blade 52 is again lowered to engage and force the last mentioned overlying portion of the strap section S' through the opening 260 in the buckle 94, but not through the aligned opening in the lower buckle 126. In this manner, the two buckles 94 and 126 are assembled with the strap sections S and S' and an adjustable loop is formed in the strap section S' which is looped through both buckles, as fully illustrated and described in both of my prior patents. The buckles thus assembled with the strap sections are then removed from the jaws 74 and 76 and may be left suspended on the needle 256.

While I have shown and described the preferred embodiment of my invention, it will be understood that various changes may be made in the present invention without departing from the underlying idea or principles of the invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In apparatus for the assembly of a plurality of apertured buckles with straps to form an adjustable strap, vertically positioned buckle magazines having outlet openings at their lower ends, a buckle-receiving device disposed relative to the outlet opening of each magazine, said buckle-receiving devices being positioned in vertically spaced alignment, and means for transferring buckles in timed relation from one of said buckle magazines to one of said buckle-receiving devices and from another of said magazines to another of said buckle-receiving devices, whereby to provide in said buckle-receiving devices buckles disposed in vertical alignment so as to position their apertures in vertical alignment for facilitating the threading of a strap through the aligned apertures.

2. In apparatus for the assembly of a plurality of apertured buckles with straps to form an adjustable strap, buckle-receiving devices positioned in different horizontal planes for holding a plurality of buckles in vertically spaced alignment for assembly with a companion strap, buckle magazines disposed at the same side of a single plane and associated with said buckle-receiving devices, respectively, for supplying buckles to said buckle receiving devices, respectively, and means for transferring buckles in timed relation from one of said buckle magazines to one of said buckle-receiving devices and from another of said magazines to another of said buckle-receiving devices, whereby to provide in said buckle-receiving devices buckles disposed in vertical alignment so as to position their apertures in vertical alignment for facilitating the threading of a strap through the aligned apertures.

3. In apparatus for the assembly of a plurality of apertured buckles with straps to form an adjustable strap, vertically positioned buckle magazines having outlet openings at their lower ends, a buckle-receiving device disposed relative to the outlet opening of each magazine, said buckle-receiving devices being positioned in vertically spaced alignment, and means for transferring buckles in timed relation from one of said buckle magazines to one of said buckle-receiving devices and from another of said magazines to another of said buckle-receiving devices, whereby to provide in said buckle-receiving devices buckles disposed in vertical alignment so as to position their apertures in vertical alignment for facilitating the threading of a strap through the aligned apertures, said transferring means including buckle-tracks extending between each outlet opening and its associated buckle-receiving device, and means for moving buckles from the magazines to said tracks and along the latter to the associated buckle-receiving devices, respectively.

4. In apparatus for the assembly of a plurality of apertured buckles with straps to form an adjustable strap, vertically positioned buckle magazines having outlet openings at their lower ends, a buckle-receiving device disposed relative to the outlet opening of each magazine, said buckle-receiving devices being positioned in vertically spaced alignment, and means for transferring buckles in timed relation from one of said buckle magazines to one of said buckle-receiving devices and from another of said magazines to another of said buckle-receiving devices, whereby to provide in said buckle-receiving devices buckles disposed in vertical alignment so as to position their apertures in vertical alignment for facilitating the threading of a strap through the aligned apertures, said transferring means including buckle-tracks extending between each outlet opening and its associated buckle-receiving device, and means for moving buckles from the magazines to said tracks and along the latter to the associated buckle-receiving devices, respectively, said tracks being disposed in vertically spaced horizontal planes, respectively, and converging laterally toward each other from said magazine outlets to said buckle-receiving devices.

5. In apparatus for the assembly of a plurality of apertured buckles with straps to form an adjustable strap, buckle-receiving devices positioned in different horizontal planes for holding a plurality of buckles in vertically spaced alignment for assembly with a companion strap, buckle magazines disposed at the same side of a single plane and associated with said buckle-receiving devices, respectively, for supplying buckles to said buckle receiving devices, respectively, and means for transferring buckles in timed relation from one of said buckle magazines to one of said buckle-receiving devices and from another of said magazines to another of said buckle-receiving devices, whereby to provide in said buckle-receiving devices buckles disposed in vertical alignment so as to position their apertures in vertical alignment for facilitating the threading of a strap through the aligned apertures, said transferring means including buckle-tracks extending between each outlet opening and its associated buckle-receiving device, and means for moving buckles from the magazines to said tracks and along the latter to the associated buckle-receiving devices, respectively, said magazines being disposed laterally of each other and said tracks converging laterally toward each other from the outlets of said magazines to said buckle-receiving devices.

6. In apparatus for the assembly of a plurality of apertured buckles with straps to form an adjustable strap, a pair of vertically positioned laterally related gravity feed buckle magazines having outlet openings at their lower ends, said outlet openings being in different horizontal planes, a buckle-receiving device associated with each outlet opening, said buckle-receiving devices being disposed in vertical registry, a buckle track extending between each outlet opening and its associated buckle-receiving device, said tracks being in different horizontal planes and converging laterally toward said buckle-receiving devices, and means for transferring a pair of buckles in timed relation from said outlet openings along the associated tracks to said buckle-receiving devices, whereby to provide in said buckle-receiving devices a pair of buckles which are in vertical registry so as to position their apertures in said vertical registry for facilitating the threading of a strap through said apertures.

7. In apparatus of the character described, means defining a buckle track, a vertically positioned buckle magazine having an outlet opening at its lower end, said opening being aligned with said track, and a transfer element operable in said outlet opening for transferring the buckles from said magazine to said track, said transfer element being mounted for reciprocation from a retracted

to a projected position thereof for effecting said transfer of the buckles, said transfer element and said magazine having portions thereof which inter-engage in the retracted position of the transfer element for preventing the withdrawal of the magazine from said apparatus.

8. In apparatus of the character described, means defining a buckle track, a vertically positioned buckle magazine having an outlet opening at its lower end, said opening being aligned with said track, and a transfer element operable in said outlet opening for transferring the buckles from said magazine to said track, said transfer element being mounted for reciprocation from a retracted to a projected position thereof for effecting said transfer of the buckles, said magazine opening being defined by confronting wall portions at the lower end of said magazine, and said transfer element overlying said wall portions in the retracted position thereof for preventing the withdrawal of the magazine from said apparatus.

9. In apparatus of the character described, means defining a buckle track, a vertically positioned buckle magazine having an outlet opening at its lower end, said opening being aligned with said track, and a transfer element operable in said outlet opening for transferring the buckles from said magazine to said track, said transfer element

being mounted for reciprocation from a retracted to a projected position thereof for effecting said transfer of the buckles, said magazine opening being defined by confronting wall portions at the lower end of said magazine, and said transfer element overlying said wall portions in the retracted position thereof for preventing the withdrawal of the magazine from said apparatus, and means for withdrawing said transfer element from said retracted position thereof for releasing the magazine.

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