

F. H. WILBUR.
STAPLING MACHINE FOR LEATHER LOOPS.
APPLICATION FILED SEPT. 15, 1919.

1,400,843.

Patented Dec. 20, 1921.

2 SHEETS—SHEET 1.

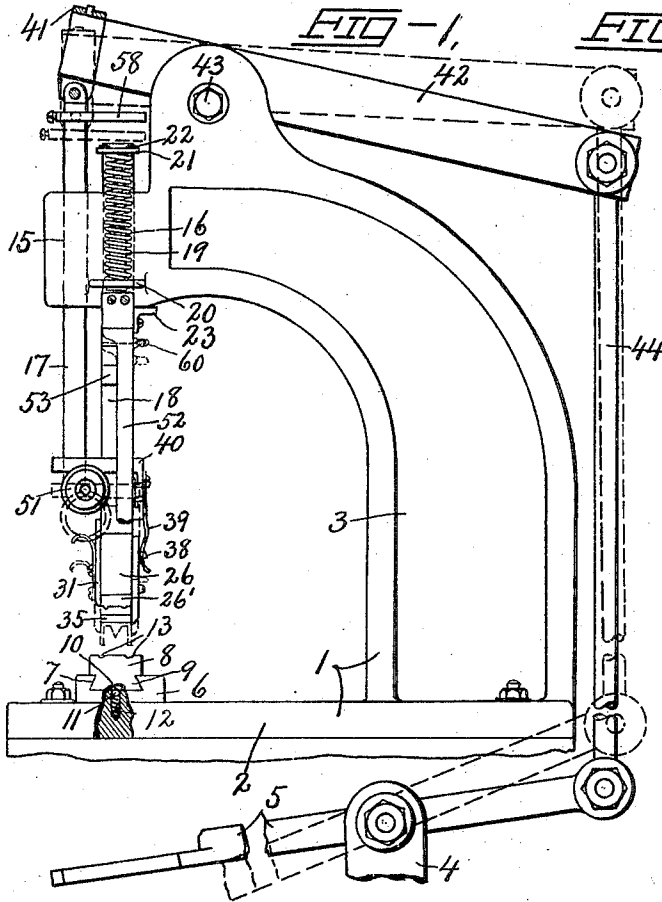
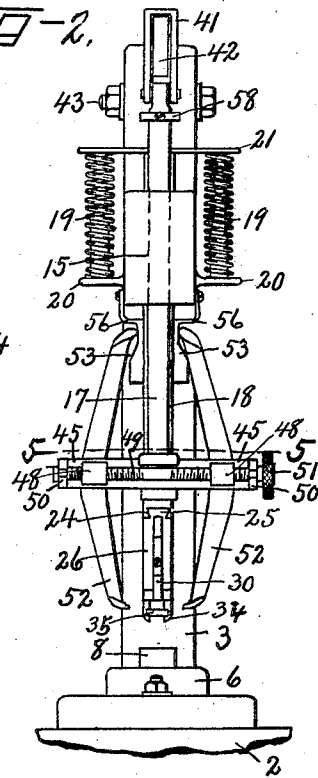


FIG. 3

FIG. 4

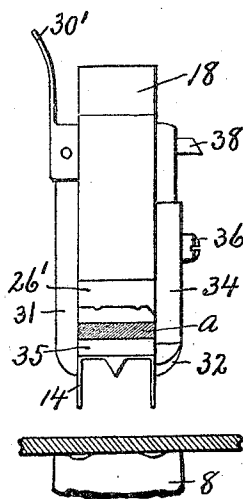
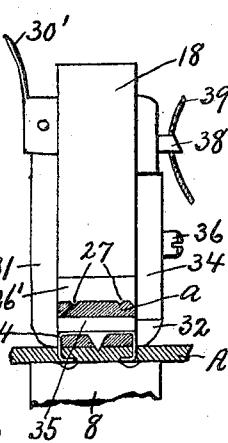
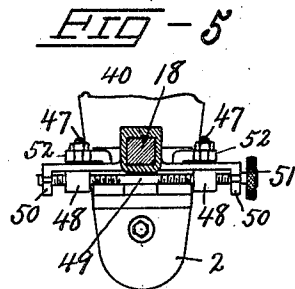


FIG. 6



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2 SHEETS—SHEET 2.

FIG-7.

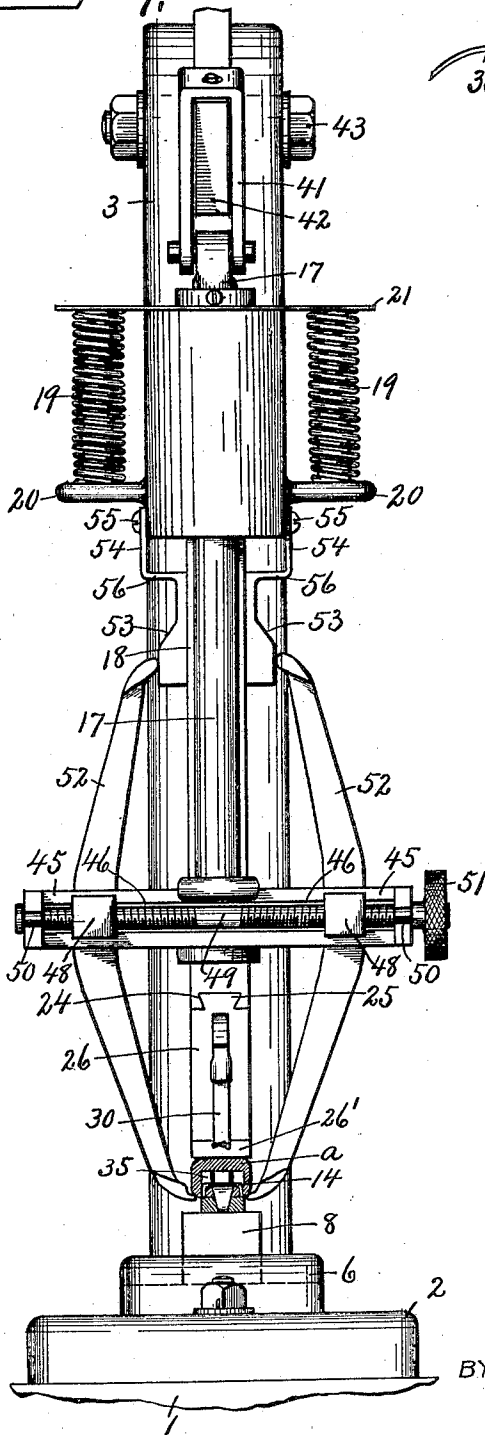


FIG-8.

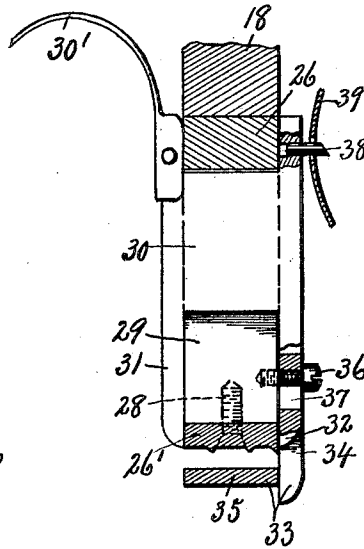
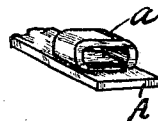


FIG-9.



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STAPLING-MACHINE FOR LEATHER LOOPS.

1,400,843.

Specification of Letters Patent.

Patented Dec. 20, 1921.

Application filed September 15, 1919. Serial No. 323,992.

To all whom it may concern:

Be it known that I, FREDERICK H. WILBUR, of Binghamton, in the county of Broome, in the State of New York, have invented new and useful Improvements in Stapling-Machines for Leather Loops, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in loop forming and attaching machines to be used in connection with harness making and other arts where loops of leather or other flexible material are to be applied to straps of the same or different material.

The stock for these loops is usually cut to the desired length from a strip of leather of predetermined width to form substantially flat blanks which are then folded around a suitable form with their ends lying substantially in the same plane and in close juxtaposition where they are fastened to a strap or other body by metal clencher immediately following the folding operation, so that the folding and clenching are performed in practically one and the same operation.

It is well known that these loops vary materially in width and length and the main object of my present invention is to provide means whereby the same machine may be used for applying loops of different lengths.

Another object is to provide means for supporting a clencher within the loop during the folding operation and for automatically releasing said clencher and loop immediately following the folding and clenching operations.

Another object is to provide means for removing the strap, with the loop attached thereto, from the form.

Other objects and uses relating to specific parts of the machine will be brought out in the following description.

In the drawings:—

Figure 1 is a side elevation partly in section and partly broken away of portions of a loop forming and attaching machine embodying the various features of my invention.

Fig. 2 is a front elevation of the same, omitting the pedal lever.

Figs. 3 and 4 are enlarged side elevations, partly in section, of the work supporting bed and loop forming and applying mechanism in its open and closed positions respectively.

Fig. 5 is a horizontal sectional view taken on line 5—5, Fig. 2.

Fig. 6 is a perspective view of one of the clencher staples.

Fig. 7 is an enlarged front elevation of the essential portion of the machine.

Fig. 8 is an enlarged sectional view of the blank holder and former around which the blank is to be folded, together with the means for folding and releasing the blank upon and from the forming die.

Fig. 9 is a perspective view of a portion of a leather strap and loop attached thereby by the forming and attaching machine.

As illustrated this machine comprises a main supporting frame—1—consisting of a horizontal bed—2—and an upright bracket—3—, said frame being also provided with a supporting member—4—for a pedal lever—5— by which the movable parts of the loop forming and clenching mechanism may be operated in a manner hereinafter described.

The bed—2—is provided with a boss—6—projecting a short distance above its upper face and preferably formed integral therewith, said boss being provided with a dove-tailed groove—7—for receiving and supporting a lower die or anvil—8—, the latter being provided with a dove-tailed rib—9—, slidably fitted in the groove—7—which permits the anvil to be removed and replaced by others of different sizes according to the dimensions of the work to which a loop is to be applied.

The lower face of the die or anvil—8—is provided with a slight depression—10—for receiving a ball catch—11—which is forced into the recess—10—by a light coil spring—12—when the die—8—is adjusted to its proper position in registration with the superposed plunger presently described, the upper face of said die being provided with grooves—13—for deflecting the points of a staple as—14—by which the ends of the loop as—A—are fastened to the strap or body—A—, as shown in Figs. 4 and 9.

The upper end of the bracket —3— overhangs the die or anvil —8— and is provided with vertical guide-ways —15— and —16— arranged one in front of the other in close proximity for receiving a vertically movable connecting rod —17— and a similarly movable plunger —18—, and guiding them in parallelism during their vertical movement.

The plunger —18— is alined vertically with the die or anvil —8— and coöperates therewith in a manner hereinafter described for moving the loop-blank and loop together with the staple into engagement with the work or strap —A— on the anvil —8— against the action of a pair of retracting springs —19—, the lower ends of which rest upon stationary lugs —20— on opposite sides of the arm or bracket —3—, while their upper ends are engaged with the plate —21— on the upper end of the plunger as shown more clearly in Figs. 2 and 7, said plate being held in its operative position by a removable key —22—, so that by removing the key, the plate —21— and springs —19— may be also removed or replaced at will.

A stop shoulder —23— is secured to the rear face of the plunger —18— for engagement with the under side of the adjacent portion of the arm or bracket —3— for limiting the upward movement of said plunger by the springs —19—. The lower end of the plunger —18— is provided with a dove-tailed groove —24— for receiving a similarly shaped rib —25— on the upper end of a removable section —26— of said plunger so that the section —26— may be removed and replaced by other sections of different sizes according to the dimensions of the loop which it is adapted to support or retain in place during the application of the loop to the strap or body —A—.

The lower end of the section —26— is made of hardened steel and is provided with ribs —27— for impressing corresponding finishing grooves in the upper surface of the loop while the latter is being applied to the strap —A—, the said hard portion being preferably made separate from the main body and the section —26— and is secured thereto by one or more screws —28—, shown by dotted lines in Fig. 8.

The section —26— is also provided with an opening —29— therethrough from front to rear and extending from the hardened portion as —26'— to within a relatively short distance from the top of the upper end of the section —26—, so as to form a guide for a vertically movable holder —30—, having front and rear pendant arms —31— and —32—, adapted to travel across the corresponding faces of the hardened section —26'— as it is moved vertically in a manner hereinafter described.

An angular blank support —33— having an upright portion —34— and a horizontal portion —35— is mounted upon the plunger section —26— for supporting the loop-blank and loop while it is being attached to the body —A—, the horizontal portion —35— constituting the die or form around which the blank is folded into the form of a loop by mechanism presently described, the rear upright portion being attached to the corresponding face of the section —26— by screws —36— which pass through vertically elongated slots —37— in the upright portion of the part —33— to permit slight vertical adjustment of the die —35— for different thicknesses of leather or other material from which the loop is to be formed, it being understood that the form —35— is normally spaced apart from and below the lower face of the die —26'— of the plunger section —26—, as shown more clearly in Fig. 8.

The holder —30— is normally held in its uppermost position by means of a catch —38— thereon and a spring detent —39— which is secured to a cross-head —40— on the lower end of the connecting rod —17—, the upper end of said rod being connected by a link —41— to the front end of the rock arm or lever —42— which is fulcrumed at —43— upon the arm —3— of the main supporting frame and has its rear end connected by a link —44— to the lower end of the pedal lever —5— as shown in Fig. 1.

The cross-head —40— has a limited vertical sliding movement on the plunger —18— for a purpose hereinafter described and is provided with opposite laterally projecting arms —45— having lengthwise slots —46— for receiving and guiding a pair of sliding laterally adjustable pivotal bolts —47— which are located equal distances at opposite sides of the plunger —18— and are provided with internally threaded heads or nuts —48— for engagement with opposite threads of a rotary spindle —49—, the latter being journaled in suitable bearings —50— on the outer ends of the arms —45— and is provided with a hand-wheel —51— by which it may be rotated for adjusting the pivotal bolts —47— simultaneously in opposite directions toward and away from the plunger —18—.

A pair of levers —52— are centrally pivoted to the bolts —47— so as to stand in a vertical position at opposite sides of the plunger —18— and have their upper ends coöperating with suitable cams —53— for rocking said levers about their pivots and thereby causing their lower ends to fold the ends of the blank around and under the form —35— as the plunger is forced downwardly by the depression of the front end of the pedal lever —5— in the operation

of securing said ends to the strap or body—A—.

The same time firmly locking them to the strap—A—.

The cams —53— are provided with extensions —54— which are secured by screws —55— to opposite faces of the front portion of the arm or bracket —3—, said extensions being provided with stop shoulders —56—, adapted to be engaged by the upper ends of the levers —52— as the plungers —17— and —18— are returned upwardly to limit the upward movement of the plunger —17— and its cross-head —40—, said plunger —17— and head —40— having a limited upward movement after the plunger —18— reaches the limit of its upward movement by the engagement of the stop —23— with the adjacent portion of the arm or bracket —3—.

The spring detent —39— may be disengaged by hand from the catch —38— to allow the member —30— to drop by its own weight to the limit of its downward movement relatively to the plunger —18— which would enable the staple to be inserted between the jaws in substantially the same manner as previously described, the member —30— being provided with a finger piece —30'— by which it may be raised or lowered. A spring —60— connects the upper ends of the levers —52— at the rear of the plunger for the purpose of opening the lower ends thereof to release the loop when the plunger is raised to its normal position.

The upper end of the plunger —17— is provided with a rearwardly projecting arm —58— rigid thereon, but adjustable and adapted to engage the upper end of the plunger —18— after the plunger —17— has been moved downwardly a limited distance by the operation of the lever —42—, the limited movement referred to being approximately equal to that of the distance between the low ends of the cams —53— and stop shoulders —56—, the object of which is to move the lower ends of the arms —31— and —32— from a position Fig. 8 above the intervening space between the form —35— and lower end of the plunger section —26— across the front and rear of said space so as to retain the blank which may have been previously placed in the space upon the form —35— in operative position ready for folding by the lower ends of the levers —52— as the plunger —17— continues its downward movement to operate the plunger and cause the upper ends of the levers —52— to ride upon the high points of the cams —53— for folding the ends of the blank underneath the form —35— as shown in Fig. —7—.

Operation: Assuming that the movable parts are in their normal positions as shown in Figs. 1, 2, and 8, the loop blank is then placed by hand upon the upper face of the form —35— with its ends extending equal distances beyond the opposite sides of said form. The pedal lever is then operated to move the plunger —17— until its member —58— engages the upper end of the plunger —18— at which time the fingers —31— and —32— will have been moved across the front and rear faces of the form to hold the blank thereon, while the upper ends of the levers —52— will have just begun to engage the cams —53—.

This first movement of the connecting rod —17— independently of the plunger —18— also projects the fingers —31— and —32— of the holder —30— below the lower face of the form —35— Fig. 3 and the projecting ends constitute jaws between which the staple as —14— is placed by hand and held by friction as the connecting rod and plunger continue to descend toward the anvil —8—. During this latter operation, the ends of the blank are folded underneath the main body of the staple by the lower ends of the levers —52— while the intermediate portion of the blank rests upon the upper face of the form —35— and as the plunger continues its descent the longer prongs of the staple will be driven through the strap or body —A— and clenched against the anvil —6— while the shorter prongs will be embedded in the ends of the loop, thereby holding said ends against spreading, at

While in this position the staple is inserted between the lower ends of the fingers —31— and —32— and thereby held by friction against the under side of the form —35—. The movement of the pedal lever is then continued thereby causing the cams —53— to move the lower ends of the levers toward each other while they are being moved downwardly against the ends of the blank, so that the continued operation will fold the said ends beneath the form —35— and adjacent main body of the staple between the longer prongs thereof, it being understood that the strap or other work to which the loop is to be applied now rests upon the work supporting anvil —8—, and that the final downward movement of the plunger will force the longer prongs of the staple through the strap and clench them on the under side thereof against the anvil, while the shorter prongs will be forced into the adjacent ends of the loop, thereby forming the loop and attaching it to the strap in practically one and the same operation.

When pressure upon the pedal lever is released, the plunger —18— and connecting rod —17— will be elevated by the springs —19— until the plunger reaches the limit of its upward movement as determined by the stop —23—, after which the connecting rod —17— and cross-head thereon together with the part —30— which is connected to

the cross-head through the medium of the spring detent —39— and catch —38— will be moved still farther by the weight of the longer rear end of the lever —42— and
 5 pedal lever connected thereto, until limited by the engagement of the upper ends of the levers —52— with the stops —56—.

What I claim is:

1. In a loop-forming and attaching machine, the combination of a support for the article to which the loop is to be attached, a plunger movable toward and from the support, means for operating the plunger, said plunger having a removable section
 15 slidably interlocked with the main body thereof, a form on said section for supporting a loop-blank and around which said blank is adapted to be folded, and means actuated by the plunger operating means for
 20 folding the ends of the blank around said form.

2. In a loop-forming and attaching machine, the combination of a support for the article to which the loop is to be attached, a plunger movable toward and from the support, means for operating the plunger, said plunger having a removable section
 25 slidably interlocked with the main body thereof, a form on said section for supporting a loop-blank and around which said blank is adapted to be folded, means actuated by the plunger operating means for
 30 folding the ends of the blank around said form, and means on the plunger for receiving and temporarily holding a clenching staple in position to be clenched through the
 35 ends of the folded blank and work to which the loop is to be attached as the plunger is forced toward said support.

3. In a stapling machine for leather loops, the combination of a supporting anvil for one of the parts to be attached, a bracket
 40 overhanging the anvil, a plunger movable on the bracket toward and from the anvil, holders for the loop-blank and staples, respectively, both slidably mounted upon the
 45 plunger and movable therewith toward and from the anvil, a cross-head slidably mounted on the plunger, a pair of levers centrally
 50 pivoted to the cross-head for folding the ends of the loop-blank around its holder between the staple and anvil, whereby the movement of the plunger toward the anvil
 55 will clench the staple through the part to be attached, cams on the bracket engaging the levers above the cross-head as said cross-head is moved toward the anvil for causing
 60 said levers to fold the ends of the loop-blank around the blank-holder and staple, and means for sequentially operating the cross-head and plunger.

4. In a stapling machine for leather loops, the combination of a supporting anvil for one of the parts to be attached, a bracket
 65 overhanging the anvil, a plunger movable on

the bracket toward and from the anvil, holders for the loop-blank and staples, respectively, both slidably mounted upon the plunger and movable therewith toward and from the anvil, a cross-head slidably mounted on the plunger, a pair of levers centrally
 70 pivoted to the cross-head for folding the ends of the loop-blank around its holder between the staple and anvil whereby the movement of the plunger toward the anvil
 75 will clench the staple through the part to be attached, cams on the bracket engaging the levers above the cross-head as said cross-head is moved toward the anvil for causing
 80 said levers to fold the ends of the loop-blank around the blank-holder and staple, means for sequentially operating the cross-head and plunger, and a spring for yieldingly
 85 holding the upper ends of the levers in engagement with said cams.

5. In a stapling machine for leather loops, the combination of a supporting anvil for one of the parts to be attached, a bracket
 90 overhanging the anvil, a plunger movable on the bracket toward and from the anvil, holders for the loop-blank and staples, respectively, both slidably
 95 mounted upon the plunger and movable therewith toward and from the anvil, a cross-head slidably mounted on the plunger, a pair of levers centrally pivoted to the
 100 cross-head for folding the ends of the loop-blank around its holder between the staple and anvil whereby the movement of the plunger toward the anvil will clench the
 105 staple through the part to be attached, cams on the bracket engaging the levers above the cross-head as said cross-head is moved toward the anvil for causing said
 110 levers to fold the ends of the loop-blank around the blank-holder and staple, means for sequentially operating the cross-head and plunger, and means for adjusting the
 115 lever pivots toward and from each other for varying the opening movement of the lower
 120 ends of said levers according to the size of the loop required.

6. In a stapling machine for leather loops, the combination of a supporting anvil for one of the parts to be attached, a bracket
 125 overhanging the anvil, a plunger movable on the bracket toward and from the anvil, holders for the loop-blank and staples, respectively, both slidably mounted upon the
 130 plunger and movable therewith toward and from the anvil, a cross-head slidably mounted on the plunger, a pair of levers centrally pivoted to the cross-head for folding the
 135 ends of the loop-blank around its holder between the staple and anvil whereby the movement of the plunger toward the anvil will clench the staple through the part to
 140 be attached, cams on the bracket engaging the levers above the cross-head as said cross-head is moved toward the anvil for causing

said levers to fold the ends of the loop-
blank around the blank-holder and staple,
means for sequentially operating the cross-
head and plunger, and means including a
5 screw-spindle journaled on the cross-head
for moving the lever-pivots toward and
from each other.

In witness whereof I have hereunto set
my hand this 19 day of August, 1919.

FREDERICK H. WILBUR.

Witnesses:

T. W. WHIPPLE,
F. L. WILBUR.