

July 23, 1946.

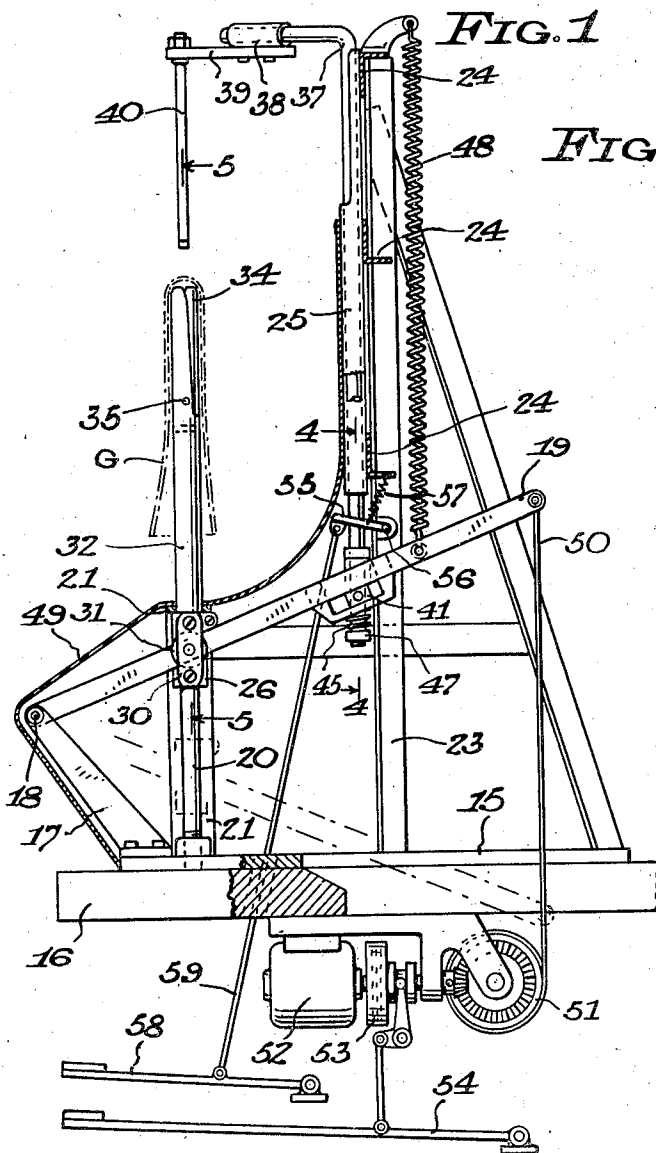
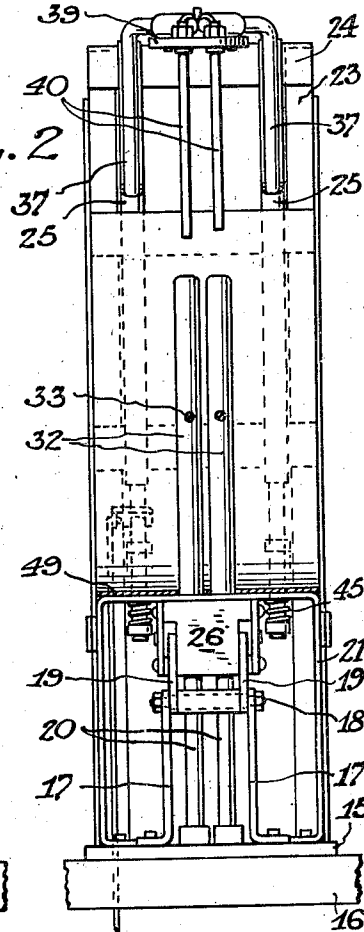
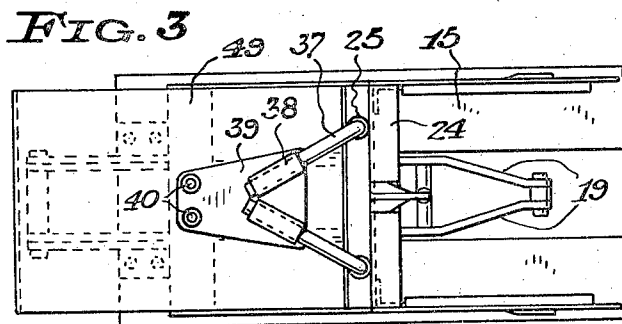
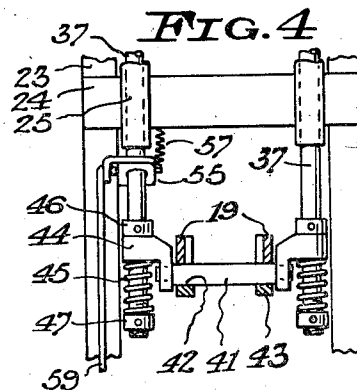
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2,404,346

GLOVE TURNING APPARATUS

Filed Sept. 25, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 5

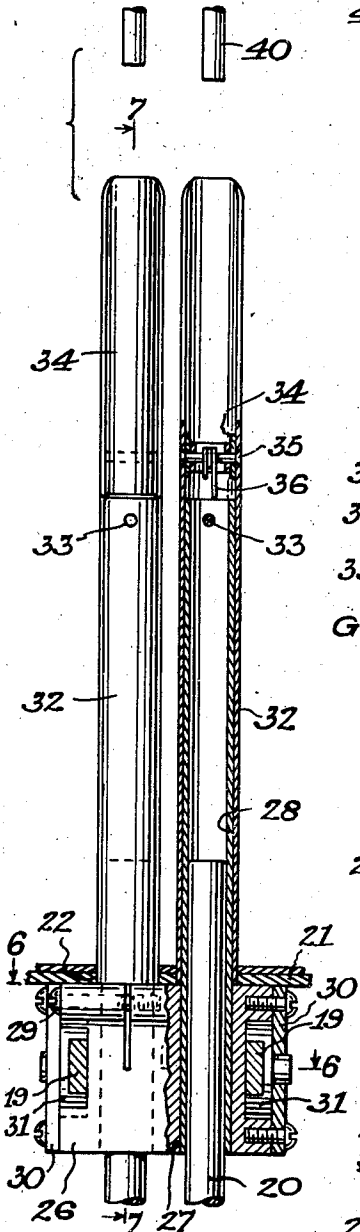


FIG. 7

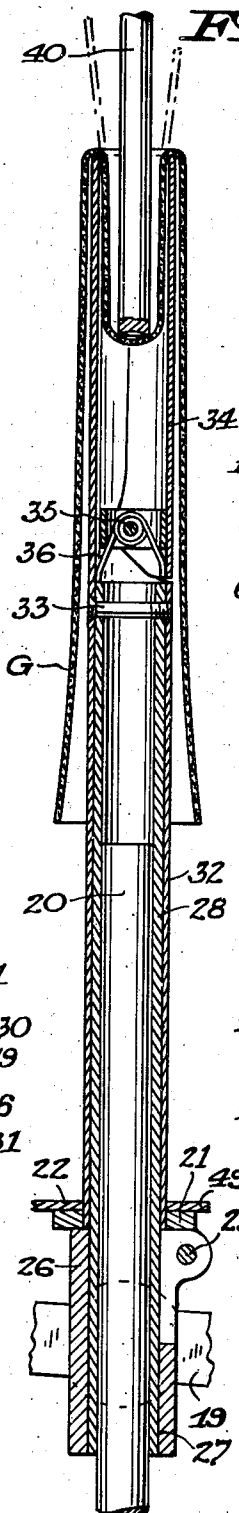


FIG. 8

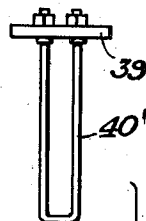


FIG. 11

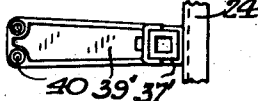


FIG. 12

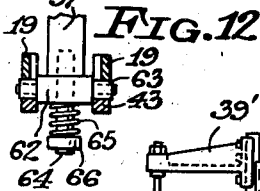
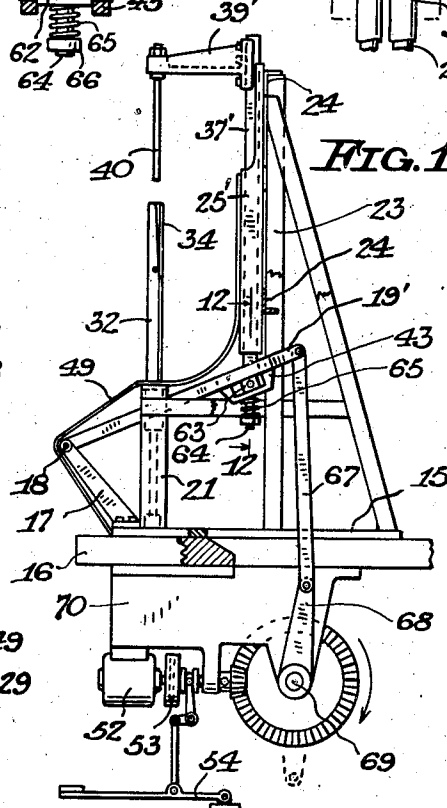
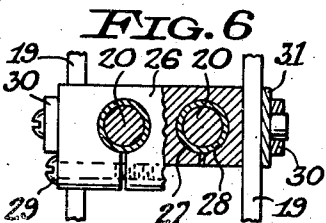


FIG. 10



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GLOVE TURNING APPARATUS

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5 Claims. (Cl. 223-40)

1

The present invention relates to apparatus for turning or inverting gloves and the like, as for placing seams thereof on the inside.

An object of the invention is to provide an improved apparatus of simple and durable construction for expeditiously turning gloves and mittens without danger of tearing or other injury.

Another object is to provide a glove turning apparatus which is adapted to operate simultaneously on a plurality of finger sheaths.

A further object is to provide an apparatus which by simple modification can operate on either gloves or mittens.

A still further object is to provide a power-operated glove turning machine having means for limiting the force applied to the work so as to avoid damage to the work.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawings, illustrating certain embodiments of the invention,

Fig. 1 is a side elevation of a glove turning machine constructed in accordance with the invention, parts being broken away and parts being shown in section;

Fig. 2 is a front elevation, parts being shown in section;

Fig. 3 is a top view;

Fig. 4 is a detail sectional elevation, taken generally along the line 4-4 of Fig. 1;

Fig. 5 is a detail sectional elevation, taken generally along the line 5-5 of Fig. 1;

Fig. 6 is a detail sectional view taken generally along the line 6-6 of Fig. 5;

Fig. 7 is a detail sectional elevation taken generally along the line 7-7 of Fig. 5, and showing a glove partly turned;

Fig. 8 is a front detail view showing the machine modified to turn mittens;

Fig. 9 is a top view of a hollow mitten supporting member;

Fig. 10 is a side elevation of a modified form of glove turning machine, parts being broken away and parts being shown in section;

Fig. 11 is a fragmentary top view of the machine of Fig. 10, and

Fig. 12 is a detail sectional elevation taken generally along the line 12-12 of Fig. 10.

In the form of the invention shown in Figs. 1 to 7, a U-shaped base plate 15 is adapted to be mounted on a bench top 16 or other support. Spaced bracket arms 17 extend forwardly and upwardly from the base plate and carry a horizontal pivot bolt 18. An oscillatory lever comprising a pair of bars 19 is mounted at its front

2

end on the pivot bolt 18 and is actuated as herein-after described. Two vertical guide posts or rods 20 are rigidly secured to the base plate near the front thereof and are disposed between the lever bars 19, the posts being spaced transversely of the base plate. A bracket 21 of inverted U-shape is rigidly secured to the base plate to straddle the lever bars 19 and has a horizontal top portion with spaced openings 22 in register with the posts. Spaced upright frame bars 23 are rigidly secured to the base plate rearwardly of the bracket 21 and at opposite sides of the lever 19, and are suitably braced on the base plate. The frame bars 23 are rigidly connected by cross-bars 24 to which a pair of vertical guide tubes 25 are rigidly secured, as by welding, the guide tubes being arranged at opposite sides of the lever 19 and being cut away at their upper front portions.

A reciprocatory cross-head 26 is vertically movable on the guide posts 20 and has vertical bores 27 in which are clamped the lower end portions of a pair of vertical tubes 28, the cross-head having split portions which are contracted about the tubes by clamping screws 29. The cross-head 26 is disposed between the lever bars 19 and is confined thereon by side plates 30. The lever bars are here shown to fit slidably in transversely channeled disk-like bearing blocks 31 which are pivotally mounted in the opposite sides of the cross-head.

A pair of tubular glove-supporting members 32 fit snugly but detachably over the respective tubes 28 and are secured thereto by transverse screws 33. The rounded upper end portions of the two spaced tubular members 32 are adapted to receive thereon adjacent finger sheaths of a glove G which is to be turned or inverted. Preferably, each tubular member 32 has an expansible split top portion one half of which is formed by a swingable section 34 pivoted at its lower end on a transverse pivot pin 35. A torsion spring 36 surrounding the pivot pin 35 maintains the swingable section in its normal position.

A pair of rods 37 are slidable in the guide tubes 25 and have forwardly projecting upper ends which are rigidly secured in sockets 38 on a horizontal plate 39. The plate has rigidly secured thereto a pair of spaced downwardly projecting vertical pins or rods 40, the lower ends of which are adapted to engage the tips of the glove finger sheaths supported on the tubular members 32 and to urge these sheaths into the tubular members. The lower ends of the pins are cupped or otherwise formed to improve the grip on the gloves. Preferably, one pin extends

3

slightly lower than the other as seen in Fig. 2, in cases where the glove finger sheaths are of different length. The lower ends of the slidable rods 37 are connected to a cross-member 41 which is slidably mounted in slots 42 formed between the lever bars 19 and yoke members 43 secured to the lever bars, the slots extending longitudinally of the lever bars. Preferably, the connection is a yielding one, the cross-bar 41 being pivoted in blocks 44 slidable on the rods 37 and urged upwardly by coiled springs 45 surrounding the rods, the blocks normally abutting against superposed stop collars 46 on the rods, and the springs being held under adjustable compression by nuts or collars 47. The distance between the pivot bolt 18 and the cross-member 41 is approximately twice the distance between the pivot bolt and the cross-head 26, so that when the lever 19 is swung downwardly the inverting pins 40 will have a downward displacement approximately twice that of the tubular members 32. The levers 19 and the various parts connected therewith are urged to their uppermost positions by a coiled tension spring 48 extending between the levers and the uppermost frame cross-bar 24. A sheet metal guard 49 extends upwardly and forwardly from the base plate 15 and thence upwardly and rearwardly over the bracket 21, the guard being apertured to pass the tubular members 32 and being secured at its rear portion on the guide tubes 25.

The lever 19 is power-actuated on the inverting stroke. A cord or cable 50 is connected to the rear end of the lever and extends downwardly below the bench top where it passes around a winding drum 51. The drum has a suitable gearing connection with a power shaft, such as that of an electric motor 52, and is driven through a friction clutch 53 which is suitably controlled by the operator, as by a treadle 54. The clutch is preferably of the type which will slip at a predetermined load so as to limit the downward force exerted on the lever 19 and thus avoid excessive stresses on the work. Upon release of the clutch the spring 48 will return the lever 19 to its uppermost position.

Instead of intermittently actuating the clutch, the motor may be intermittently energized. In such case the motor is preferably of a type, such as a torque motor, which will not be injured by stalling. By limiting the motor power, injury to the work will be prevented.

It is desirable to hold the lever 19 in its lowermost position for a short time to allow the operator to turn the cuff of the glove, after all the finger sockets or sheaths have been turned. This can be done in various ways, as by slipping the clutch or stalling the motor, or by providing other retaining means for this purpose. In the present instance one of the rods 37 passes through and is engageable by a tilting apertured clutch or latch member 55 loosely pivoted at 56 on the adjacent frame bar 23 and urged upwardly by a spring 57. The latch member does not interfere with downward movement of the rod, but will prevent upward movement until the latch member is released from its binding engagement, as by a treadle 58 connected to the latch member by a reach rod or cable 59.

For each inverting operation the machine is placed in the condition shown in Fig. 1, the inverting rods or pins 40 being spaced above the tubular member 32. The preferred order of operation is first to invert the thumb sheath of

4

the glove, then two of the finger sheaths, and then the two remaining finger sheaths, followed immediately by inverting the cuff of the glove. As all the inverting operations are similar, it will be sufficient to describe the final operation. The operator pulls the last two glove finger sheaths over the open-topped tubular members 32, the longer sheath being under the longer inverting pin. The clutch 53 is then engaged, causing the lever 19 to move downwardly and with it the tubular members 32 and the inverting pins 40, the latter moving about twice as fast as the tubular members. The inverting pins force the glove finger sheaths into the tubular members, and because of the difference in the travel of the pins and tubular members, it is not necessary to urge the glove upwardly to provide the required slack. If undue resistance is encountered, the springs 45 will yield, and further resistance will cause the clutch 53 to slip, thus avoiding tearing or other injury to the glove. At or near the end of the sheath inverting operation the operator lifts the cuff portion of the glove to its inverted position, as indicated by dotted lines in Fig. 7. If necessary, the lever 19 is held in its lowermost position by the latch member 55 until the cuff-inverting stop is completed. Upon release of the latch member by the treadle 58, the spring 48 returns the tubular members 32 and inverting members 40 to the position of Fig. 1. The completely inverted inseam glove is then removed from the tubular members 32.

By slight changes the machine can be adapted, as seen in Figs. 8 and 9, to invert mittens. For this purpose the tubular members 32 of Fig. 1 are replaced by a pair of tubular members 32' having top portions which are cut away at 60 at their adjacent sides and which are rigidly connected by an oval band 61 to form a support for a mitten M. The inverting pins 40 of Fig. 1 are replaced by a U-shaped member 49' which is movable downwardly into the oval band 61. The machine of Figs. 8 and 9 is otherwise the same as that of Fig. 1 and operates in a similar manner.

In the modified form of machine shown in Figs. 10 to 12, the inverting pins 40 are secured to a bracket 39' which is rigidly secured to the upper end of a single vertical rod 37' suitably retained against rotation. By way of example, the rod 37' is here shown in the form of a tube of square cross-section slidable in a guide tube 25' which is rigidly secured to the cross-members 24 of the machine frame. The lower end of the rod 37' is connected to a cross-member 62 which carries pivoted slide blocks 63 fitting in the slots 42 of an oscillatory lever 19' similar to the lever 19 of Fig. 1. The rod 37' has a stem 64 which slidably passes through the cross-member 62 and carries a compressed coiled spring 65 secured by a collar or nut 66.

The lever 19' is oscillated by a connecting rod 67 pivotally secured to a crank arm 68 on a horizontal shaft 69 below the bench 16, the axis of the shaft being parallel to the pivot bolt 18. The shaft 69, which is journaled in a suitable frame 70, has a suitable gearing connection with a power shaft, such as that of an electric motor 52, and is driven through a friction clutch 53 which is suitably controlled by the operator, as by a treadle 54. As in the machine of Fig. 1, the clutch is preferably of the type which will slip at a predetermined load.

The operation of the machine of Fig. 10 is generally similar to that of Fig. 1 except that the

5

lever 19' is swung in both directions by the revolving crank arm 68. When the cuff of the glove (or mitten) is to be inverted the lever 19' is momentarily stopped at its lowermost position, where it is held by the crank arm 68 which is then approximately in the dotted line position shown in Fig. 10. In cases where it is desired to have the return stroke of the lever 19' faster than the working stroke, as is the case in the machine of Fig. 1, any conventional quick-return mechanism, such as the Whitworth motion, or a suitable cam motion, may be employed.

What I claim as new and desire to secure by Letters Patent is:

1. Apparatus for turning gloves and the like, comprising an open-ended reciprocatory tubular member adapted to receive thereover a flexible sheath to be turned, a reciprocatory inverting member adapted to enter said tubular member for urging the sheath thereinto upon relative longitudinal movement of said members, means for guiding the relative movement of said members, and means operatively connecting said members for retracting said tubular member during the inverting operation at a rate of travel approximately one-half the rate of travel of said inverting member.

2. Apparatus for turning gloves and the like, comprising an open-ended tubular member adapted to receive thereover a flexible sheath to be turned, an inverting member adapted to enter said tubular member for urging the sheath thereinto upon relative longitudinal movement of said members, and means for longitudinally reciprocating both of said members and for retracting said tubular member during the inverting stroke at a rate of travel substantially less than the rate of travel of the inverting member, said tubular member having a retracting stroke approximately one-half the active stroke of said inverting member.

6

3. Apparatus for turning gloves and the like, comprising an open-ended tubular member adapted to receive thereover a flexible sheath to be turned, an inverting member adapted to enter said tubular member for urging the sheath thereinto upon relative longitudinal movement of said members, and means for longitudinally reciprocating both of said members and for retracting said tubular member during the inverting stroke at a rate of travel approximately one-half the rate of travel of the inverting member.

4. Apparatus for turning gloves and the like, comprising an open-ended tubular member adapted to receive thereover a flexible sheath to be turned, an inverting member adapted to enter said tubular member for urging the sheath thereinto upon relative longitudinal movement of said members, means for guiding the relative movement of said members, and oscillatory lever means for longitudinally reciprocating both of said members, and for retracting said tubular member during the inverting stroke at a rate of travel approximately one-half the rate of travel of the inverting member.

5. Apparatus for turning gloves and the like comprising a frame, an upwardly projecting open-ended member movably carried by said frame for longitudinal up-and-down movement and adapted to receive thereover a flexible sheath to be turned, a longitudinally movable inverting member adapted to enter said open ended member for urging the sheath thereinto upon relative longitudinal movement of said members, and mechanism connecting said members for causing downward retracting movement of said open-ended member during the inverting operation at a rate of travel approximately one-half the rate of travel of said inverting member.

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