

June 23, 1970

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3,516,583

APPARATUS FOR TURNING TUBULAR ARTICLES

Filed July 9, 1969

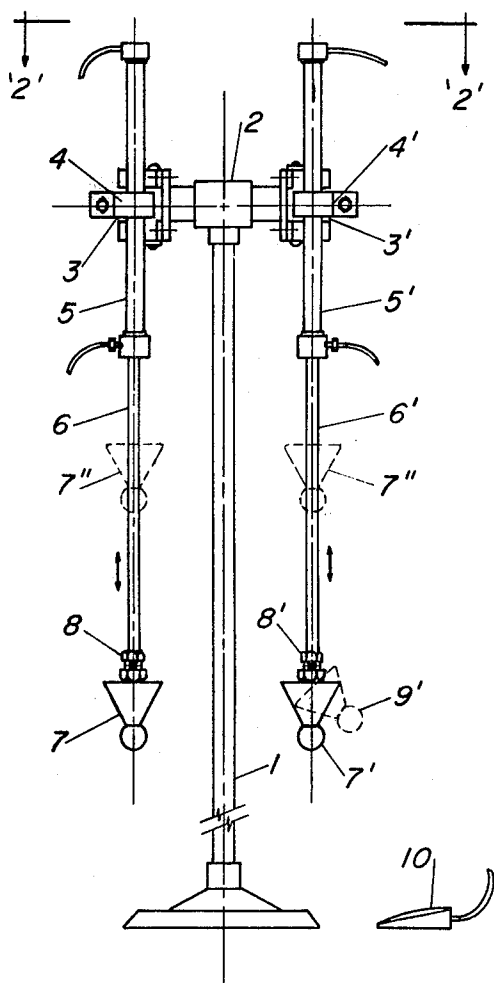


Figure 1

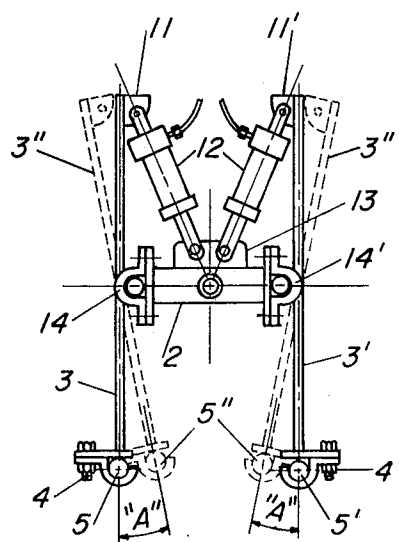


Figure 2

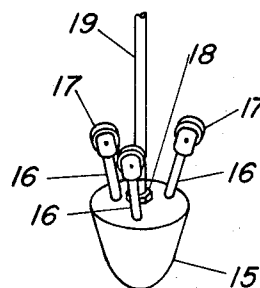


Figure 3

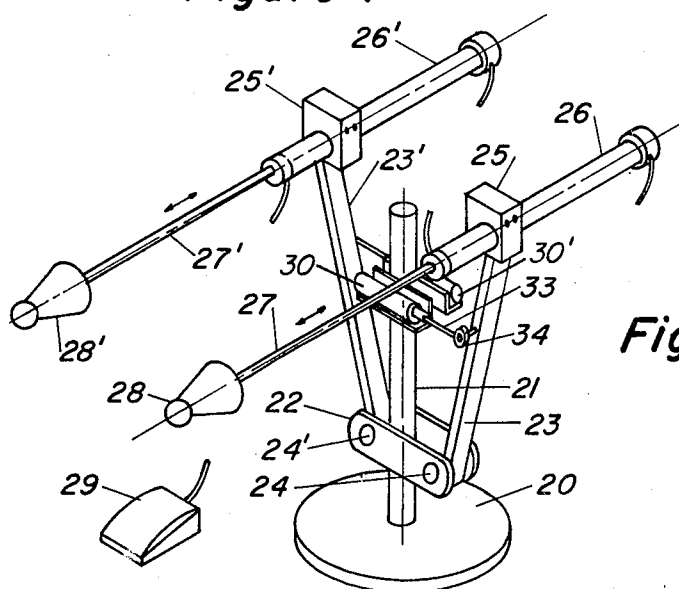


Figure 4

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APPARATUS FOR TURNING TUBULAR ARTICLES
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Filed July 9, 1969, Ser. No. 840,257
Int. Cl. A41h 43/00
U.S. Cl. 223—39 9 Claims

ABSTRACT OF THE DISCLOSURE

Two long stroke fluid cylinders are supported in a spaced apart parallel arrangement and each of the exterior ends of the piston rods from the cylinders is provided with a cone-shaped end piece. The latter are attached so as to flare outwardly on the piston rod side such that as garment sleeves or pant legs are slipped over the cone-shaped ends and rods, the cuffs thereof will be caught in the flared portions and provide for a rapid turning as the piston rods are caused to move with the cone-ends away from the hands of the operator. A preferred design also effects a movement of the fluid cylinder support means such that the two parallel units are brought closer together as the rod ends are pulled toward the cylinders and a garment can be pulled off more readily with one hand of the operator.

SPECIFICATION

This invention relates to a simplified and improved form of apparatus for turning tubular articles. More particularly, the invention is directed to the use of special support means for long stroke fluid cylinders and special cone-shaped end pieces for the latter which will assist an operator in effecting the rapid turning of the sleeves or legs of a garment.

In the garment manufacturing industry, it is of course customary to sew the garments together such that they are wrong side out when the stitching is completed. The same is true of gloves, bags and many other tubular items. Thus, in a rapid production line system, it is necessary to have a means for effecting the quick turning of each garment or tubular form articles. In connection with pants, shirts, sweaters, etc. it is also particularly desirable to have a dual arrangement in that the apparatus should be able to handle both sleeves or extremities of each particular garment.

It may be considered a principal object of the present invention to provide a garment turning device which uses a parallel arrangement of a pair of long stroke fluid cylinders, each of which have cone or cup-like end pieces on the external ends of the piston rods that are, in turn, designed to catch the cuffs of pant legs or sleeves or the ends of other type tubular members to assist in a rapid turning operation.

It is a further object of the invention to provide a special support arrangement for the fluid cylinders such that the latter will be moved by automatic means to a substantially closer position so that for the turning of pairs of sleeves or legs of a garment there will be permitted an easier removal of the garment from the device by the use of only one hand of the machine operator.

Still further features of the improved apparatus design reside in the use of special conical end pieces and adjustable angular positioning thereof so that garment sleeves or legs will be more readily slipped thereover, then held for turning right side out.

Briefly, the present invention provides an apparatus for assisting in the rapid turning of the sleeve or leg portions of a garment, which comprises in combination, elevated support means for holding a pair of spaced apart long stroke fluid cylinders each of which has a long external rod portion extending from the piston rod portion thereof,

said support means including separate movable support arms for each of said fluid cylinders whereby there is adjustable spacing apart of such cylinders, a cone-shaped end piece for each external rod portion, with each such end piece adjustably connected to the rod portion to flare in the direction of the rod and, means operating the fluid cylinders in a rapid manner to provide a turning of garment portions after such portions have been pulled over the external rods and cone-shaped end pieces.

In a preferable design and construction, the support arms of the support means will be constructed and mounted to pivot, to slide, or otherwise move with respect to each other, and there will be additional power means provided to operate the movement of the support arms between at least two given positions. The parallel arrangement of fluid cylinders for accommodating a garment will be in a fairly widely spaced apart arrangement as the sleeves or pant legs of the garment are pulled over the extended rod portions, while after the turning operation, with the pulling in of the cone-shaped end pieces, there will be a substantially simultaneous movement of at least one of the support arms to bring the two long stroke air cylinders closer together and thus permit the operator to pull the garment off with the operation of one hand. On the other hand, there may be still further adjustment means so as to adjust the speed of the operation of the long stroke cylinders for different sizes and types of garments. In other words, the initial spacing or relationship of the fluid cylinders may be different for different types of shirts or pants, coats etc., while, at the same time, the closer positioning of rods and cylinders after the pulling of the sleeves or legs may be different for varying types of garments.

In one embodiment of the turning device, the cylinders and extending arms or piston rods will be in a substantially vertical arrangement such that they are readily usable for the turning of pant legs or other relatively long tubular articles. However, in connection with shirts, blouses, or other relatively small garments, or with short sleeve garments, there may be a substantially horizontal arrangement of the long stroke fluid cylinders and the support device, including the movable support arms, may be constructed so as to on a table or other elevated surface, whereby the operator may readily pull the garment sleeves or legs over the elongated rods and end cone pieces while he is in comfortable stand-up position.

Generally, the fluid cylinders will be worked by air pressure, however, it is not intended to limit the present invention to the use of any one type of power cylinder inasmuch as various fluids may be used in lieu of air pressure. Also, various valving arrangements may be used in combination with the air or other type of fluid to effect the desired operation of the elongated piston rods and cone end pieces. For example, the fluid cylinders may be operated responsive to solenoid valve arrangements in the air supply lines leading to the cylinders such that the elongated piston rods will be extended for the period that an operator pulls the sleeves or the legs of a garment over such extended rods. Also, the valving may be such that after the "up" or "in" stroke is completed, the piston rods will automatically be returned to their extended positions in a short period of time. The operator may use a foot switch or a knee-switch to in turn operate the valving means to actuate air cylinders and reciprocate the extended rods and their cone-shaped end members.

In carrying out fast "production line" operations, after the garment sleeves are pulled on the apparatus and as the cylinders start upwardly the operator should pull down on the garment to effect the rapid complete turning of the sleeves or legs. At the same time, as noted hereinbefore, where there is an automatic adjustment of the

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in-and-out spread of the parallel spacing of fluid cylinders, there will be the automatic closer spacing of the cylinders, by the movement of their support arms to bring the legs or sleeves of the garment closer together along with the inward strokes of the piston rods, whereby the operator may more easily move the entire garment with a one hand operation.

In still further modifications of the improved and simplified device, there may be various angular adjustments of the end cone pieces with respect to the axis of each piston rod member, as well as varying designs of end pieces which may be utilized in combination with the reciprocating piston rod members. In a simple embodiment, the end pieces are preferably of a cone-shape with a non-tearing low friction type of ball-end so that the tubular portion of the garment may be readily pulled thereover. The flared portion of the cone is, of course, nearest the piston rod and fluid cylinder portions of the apparatus, so that it will serve as a flange or outward extension which is capable of catching the end of a sleeve, or the cuff of a pant leg, and preclude the pulling-off of the leg or sleeve without its being properly turned. The cone-shaped end piece may of course have varying designs and it is not intended to limit the present improved combined system or apparatus arrangement for this invention to any one type of end piece inasmuch as numerous modifications may be made with respect to this portion of this device. When relatively stiff fabrics are encountered in garments or other tubular articles there may be small rollers used in combination with the cone-shaped end pieces such that the tubular material may readily slide over such end piece with a minimum of friction.

Reference to the accompanying drawing and the following description thereof will serve to more fully set forth the advantageous construction features of the turning apparatus, as well as point out operating advantages which may be obtained in connection therewith.

DESCRIPTION OF THE DRAWING

FIG. 1 of the drawing is a diagrammatic elevational view of a turning apparatus utilizing long stroke fluid cylinders in a substantially vertical and parallel arrangement.

FIG. 2 of the drawing is a diagrammatic plan view of a support arrangement for vertically held fluid cylinders, such as indicated by the line 2—2 in FIG. 1, with additional fluid power means providing for automatically adjusting the spacing of the vertically oriented fluid cylinders.

FIG. 3 indicates diagrammatically a modified form of cone end piece for use with external ends of the reciprocating piston rod means of the device.

FIG. 4 indicates, in an isometric type view, a support arrangement adapted to hold the long stroke fluid cylinders in a substantially horizontal parallel arrangement and a varying type adjustment means for effecting the automatic in-and-out spread of the elongated fluid cylinders and their rods.

Referring now particularly to FIGS. 1 and 2 of the drawing, there is indicated a floor support stand 1 in turn adapted to hold a transverse support section 2 which has opposing support arm sections 3 and 3' which in turn provide end clamp means 4 and 4' to hold long stroke fluid cylinders 5 and 5'. Each of the fluid cylinders 5 and 5' has movable and reciprocating piston rod means 6 and 6' which have attached at their external ends the respective flared or cone-shaped end pieces 7 and 7'. The latter are preferably connected to the ends of the elongated piston rod members by threaded bushings and couplings providing adjustable clamp means 8 and 8' such that, where it is desired, there may be an angular placement of the end pieces 7 and 7' to assist in the holding of the ends of the cuffs or sleeves of a particular garment. In other words, each end piece may be turned outwardly or

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adjusted so as to be in an angular position, such as shown by the dashed lines 9' in FIG. 1.

With respect to the operation of each of the fluid cylinders 5 and 5' there may be a foot control 10 or other suitable switch means, connecting through suitable solenoid valve means, to regulate the fluid flow to each of the cylinders whereby there can be the rapid simultaneous lifting of each extended rod 6 and 6' together with their respective end attachments 7 and 7'. This action is, of course, initiated after an operator has fed garment sleeves, or a pair of tubular articles, over the respective extended rod sections 6 and 6' to a point where the end portions are just beyond the flares of the respective ends 7 and 7' to insure a clean rapid turning of each tubular article. Also, as noted hereinbefore, the actuation of the switch 10 and of the air cylinders will preferably be carried out simultaneously with a downward pulling motion by the operator. The operator will normally have a grip on the upper portion of the garment ready to pull down as the piston rods start upwardly or inwardly, whereby the speed of garment turning is doubly enhanced by the opposing motions of the device and the hands of the operator.

The arrows along side of each of the extended piston rod members 6 and 6', as well as the dashed lines 7'', show that the cone-shaped end pieces will be lifted to an elevated position by the operation of the fluid cylinders upon initiating the upward movement of each piston by the foot switch 10. Inasmuch as the garment will be rapidly and almost simultaneously removed from the device as the two piston rods reach an elevated positioning there may be a subsequent returning of each rod to its extended position by additional switching means or by automatic switching means built into the control system. Inasmuch as fluid supply tubing means, valving means, and switching means are all conventional equipment in connection with the fluid cylinders usages, it has not been deemed necessary to show the switching devices, tubing, positioning of the valves, etc., in the present set of drawings.

As best shown in FIG. 2, each of the support arms 3 and 3' are held by suitable pivoting support means at 14 and 14' at intermediate points such that by having in-and-out movements for end portions 11 and 11', there will be corresponding angular movements A for the opposing ends of the support arms 3 and 3' such that the vertically held fluid cylinders 5 and 5' can be moved into a closer spaced relationship, as shown by the dashed line positions 5''. In the present embodiment, a pair of fluid cylinders 12 are positioned to connect between support means 13, on the cross support section 2, and the opposing respective end sections 11 and 11' of the support arms 3 and 3', whereby there may be automatic pivoting of each of these arms.

In a preferred operation of the garment turning apparatus, there will be the simultaneous actuation of fluid cylinders 12 with the lifting of the piston rod members 6 and 6' for the cylinders 5 and 5', whereby there will be an extension of the piston rod portions of 12 to cause the pivoting of support arms 3 and 3' into the dashed line positions 3'' and the resulting closer spacing of fluid cylinders 5 and 5'' into the 5'' positioning. As hereinbefore noted, this closer spacing is of particular advantage to the operator in permitting him to use only one hand in effecting the removal of a garment after it has been turned and is ready for removal from the cone-shaped piece of the device. In other words, the operator can make use of but one hand to lay the garments in a particular pile, and to one side of the apparatus, so that they are ready for folding as a next stage of operation. Again, after the garment has been removed from the apparatus, and as the piston rods 6 and 6' are automatically extended to be available for the next placing of the garment sleeves or other tubular members, there should be the wider positioning of such rods. This wider spacing of cylinders

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and rods will, in a preferred arrangement, be automatically taken care of by the actuation of fluid cylinders 12 through the use of normally open valving means, such that the piston rod ends of cylinders 12 will pull support arms 3 and 3' into the generally parallel arrangement, as shown by the fluid cylinder positionings 5 and 5'.

FIG. 3 of the drawing shows diagrammatically a modified smooth cone end piece 15 which has upwardly projecting rod portions 16 that, in turn, have rotatable rollers or ball bearings 17 that will assist in permitting a fabric to be quickly lifted up and over the end piece 15. The projecting arrangement for rods 16 shall, of course, provide for the catching of the end of a tubular article or piece, such as the cuff of a pant leg, and permit the entire garment or tubular piece to be pulled down in a reverse movement to effect the turning of the garment. It has been found that where particular stiff fabrics are involved in placement over a turning apparatus, it is of a real advantage to have smooth, ball bearing type means to assist in a low frictional movement of the goods over the end piece. The end piece 15 should of course have suitable adjustable mounting means 18 within its upper central portion so that it is adapted to removably connect to the end of a standard sized piston rod member 19 whereby there may be the ready removal of the entire end piece for replacement with another type piece which may be more suitable for a different type of garment or fabric. In other words, a preferred type of apparatus permits the interchangeability of end pieces, whereby the long stroke fluid cylinders may be used with a variety of end pieces to accommodate all types of garments and all types of materials.

Referring now particularly to FIG. 4 of the drawing, there is shown a relatively low height support arrangement which may be attached to a bench, table, or other elevated support means, with the base portion 20 having a substantially vertical support member 21 and cross arm means 22 in turn accommodating movable support arms 23 and 23' through pivoted end connections 24. Each of the movable support arm means 23 and 23' have upper clamping portions 25 and 25' adapted to hold the respective long stroke fluid cylinders 26 and 26'. The cylinders have respectively, elongated piston rod means 27 and 27' with cone-shaped end members 28 and 28' attached to their respective ends.

The horizontal arrangement for the cylinders 26 and 26' is such that the device may be readily used for shirts, blouses and other small lightweight garments in a table height working arrangement. However, in a manner similar to that set forth in FIG. 1, the reciprocating operation of the piston rods 27 and 27', together with their end pieces 28 and 28', will be actuated by suitable switch pedal means 29 or other solenoid operating means that is deemed convenient for an operator. Again, after a garment has been fed over the respective end pieces and rods, there will be a rapid pulling in of the extended piston rod means toward the fluid cylinders 26 and 26' so as to effect the rapid turning of the tubular portions of the garment.

A preferred design and construction for the horizontal arrangement of fluid cylinders, again utilizes means to provide a closer spacing of such cylinders as there is a completion of the inward strokes for the piston rod members 27 and 27'. In the embodiment of FIG. 4, there is indicated diagrammatically the use of a pair of additional fluid cylinder means, such as 30 and 30', to operate arms 23 and 23'. As will be noted, these fluid cylinders are attached to the support member 21 by shelf means 32 and reciprocating type piston rods 33 can operate from each cylinder to connect with pivot connection means, such as 34 on support arm means 23 and 23'. The latter may thus be rotated about pivot means 24 and 24' and move through a short arc, i.e. inwardly and outwardly with respect to support arm 21, and vary the spread between the parallel arrangement for piston rod

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members 26 and 26'. Still further, the preferred arrangement of switching and valving means with respect to the operation of support arms 23 and 23', as well as with respect to valving operations for long stroke cylinders 26 and 26', will be such that the cylinders 30 and 30' will be actuated to move the elongated cylinders 26 and 26' closer together while they are in turn being actuated to provide for the drawing in of extended piston rod members 27 and 27'. Subsequently, as the latter are extended, after the removal of the garment, so as to be in position for reuse for the next garment turning operation there will be a subsequent spreading apart of the two members by actuation of the cylinders 30 and 30' to make it easier for the operator to insert the sleeves and pant legs of such next garment.

The end pieces 28 and 28' are shown in a substantially straight position with respect to the reciprocating piston rod members 27 and 27'; however, as noted hereinbefore, the flared cone-shaped end pieces may be angularly positioned with respect to the rod members or may be made to have a different external shape and configuration so as to accommodate a particular type of garment.

It is reiterated that it is not intended to limit the present invention to the use of any one type of flared end piece or to a particular means of adjusting and attaching such end pieces to the outer ends of the respective piston rod members.

Although the present drawing and descriptions set forth the use of fluid cylinders for effecting the automatic adjustment of spread between the spaced parallel long stroke cylinders, it is to be noted that there may be manual adjustment means that will provide temporary positioning for these cylinders. In other words, for certain articles or for certain garments it may be of advantage to readily remove the automatic movement of support arms and fix a certain spread between the parallel positioned fluid cylinders.

It is also to be noted that the particular support means, types of pivoting or clamping means, etc. as shown in the drawing, are entirely diagrammatic and various modifications may be made with respect to any of the structural support means or clamping arrangements and reside within the scope of the present invention.

I claim as my invention:

1. An apparatus for assisting in the rapid turning of the sleeve or leg portions of a garment, which comprises in combination, elevated support means for holding a pair of spaced apart long stroke fluid cylinders each of which has a long external rod portion extending from the piston rod portion thereof, said support means including separate movable support arms for each of said fluid cylinders whereby there is adjustable spacing apart of such cylinders, a cone-shaped end piece for each external rod portion, with each such end piece adjustably connected to the rod portion to flare in the direction of the rod, and means operating the fluid cylinders in a rapid manner to provide a turning of garment portions after such portions have been pulled over the external rods and cone-shaped end pieces.

2. The apparatus of claim 1 further characterized in that additional fluid cylinder means connect to said movable support arms and fluid switching means connect to such cylinder means to provide for the automatic adjustment of such support arms so as to effect the automatic closer and wider spread of the long stroke fluid cylinders held thereby.

3. The apparatus of claim 1 further characterized in that said elevated support means and said separate movable support arms hold said long stroke fluid cylinders in a substantially vertically oriented parallel arrangement.

4. The apparatus of claim 1 further characterized in that said elevated support means and said separate movable support arms hold such long stroke fluid cylinders in a substantially horizontal arrangement.

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5. The apparatus of claim 1 further characterized in that each of the cone-shaped end pieces is movably adjustable in their connections to the outer ends of the external piston rod portions of the cylinder to provide a desired angular position with respect to the axis of each rod.

6. The apparatus of claim 1 further characterized in that each of the cone-shaped end pieces is of a flared construction and each has an outermost ball-form portion, whereby to provide a low friction outer extremity for the apparatus.

7. The apparatus of claim 1 further characterized in that each cone-shaped end piece combines at least one roller means therewith to assist in providing a low frictional movement of material thereover.

8. The apparatus of claim 1 further characterized in that said support arms are connected at mid portions thereof with said support means, and a movable adjustment means connects to at least one end of a support arm while the opposing ends hold said fluid cylinders, whereby

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movement of the adjustment means controls the spacing between said cylinders.

9. The apparatus of claim 1 further characterized in that each of said support arms is connected at one end thereof to said support means while the opposing ends hold said fluid cylinders, and a movable adjustment means connects with the mid-portion of at least one of said support arms whereby a movement of the adjustment means controls the spacing between said cylinders.

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