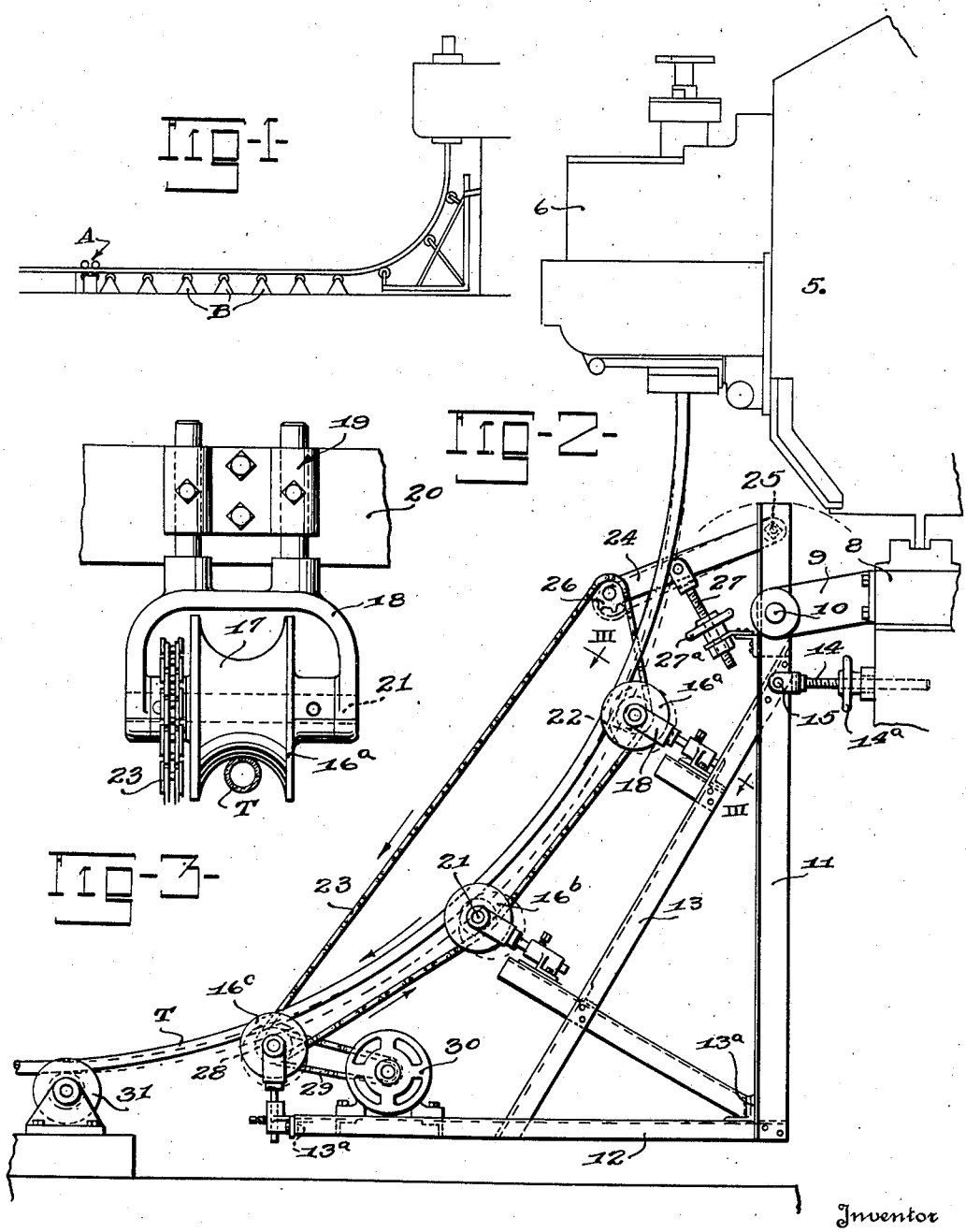
Sept. 6, 1932. L. D. SOUBIER 1,876,031

APPARATUS FOR DRAWING GLASS TUBINGS

Filed March 28, 1931 2 Sheets-Sheet 1



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Fig-4-

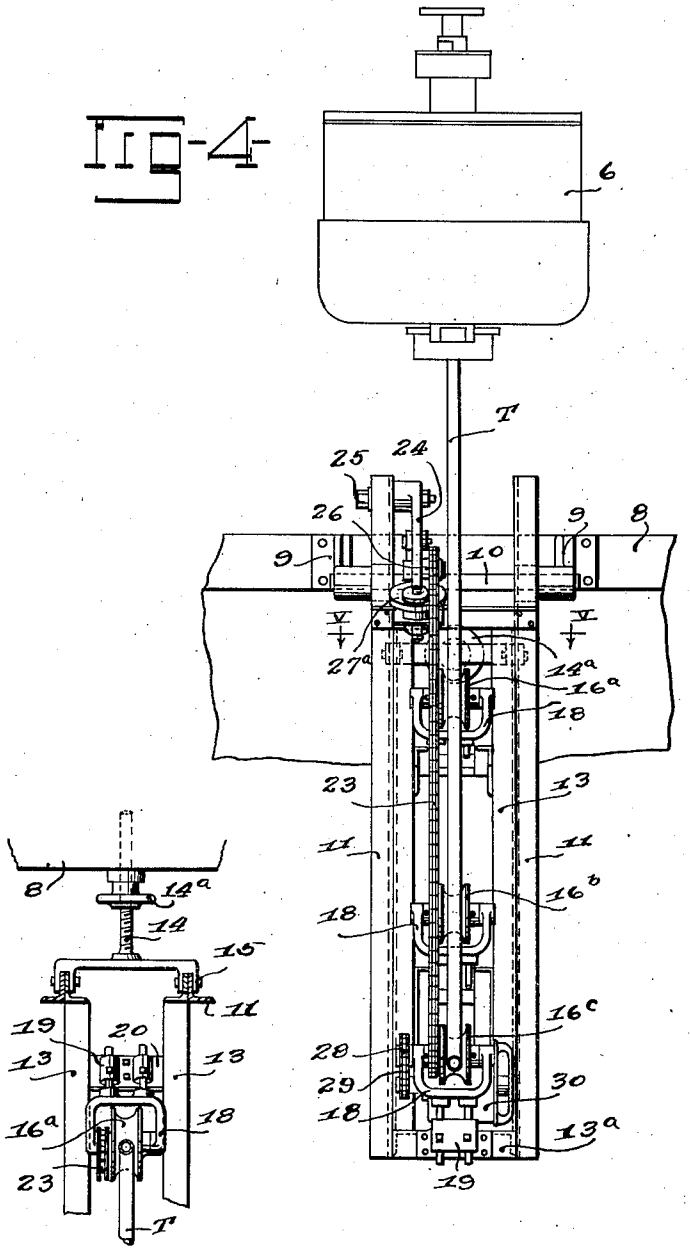


Fig-5-

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UNITED STATES PATENT OFFICE

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APPARATUS FOR DRAWING GLASS TUBINGS

Application filed March 28, 1931. Serial No. 525,907.

My invention relates to improvements in apparatus for drawing glass tubing and more particularly to a device for changing the direction of movement of the drawn tubing from a vertical to a horizontal direction.

An object of my invention is to provide means whereby the direction of movement of glass tubing, while in a more or less plastic state, may be changed without damage to the shape or conformation of the tube.

Another object is to provide means which may be adjusted to readily support the tubing in any desired curved path along which the tubing while in a plastic state, may be drawn as its direction of movement is changed.

A further object is to provide mechanism of the character indicated, which is simple in construction and readily adaptable for use with commercial types of tube drawing apparatus generally.

Other objects will be in part apparent and in part pointed out hereinafter.

In the accompanying drawings:

Fig. 1 is a diagrammatic view showing my invention in relation to the usual tube forming and drawing apparatus.

Fig. 2 is a side elevation of a construction embodying my invention, shown in conjunction with a tube former.

Fig. 3 is a sectional view taken substantially along the line III—III of Fig. 2.

Fig. 4 is a front elevation of the apparatus indicated in Fig. 2.

Fig. 5 is a sectional view taken substantially along the line V—V of Fig. 4.

The present invention is especially adapted for use in connection with an apparatus such as shown in the patent to Soubier 1,571,216, February 2, 1926, wherein glass in the form of tubing flows downwardly. This apparatus may well constitute part of a tube forming "shop" which in the present application is illustrated as comprising, in addition to the tube former, a drawing mechanism "A" and a series of conveyor rollers "B" or other devices which will determine the path along which the tubing is drawn. These elements may be of any approved or conventional form. My invention is embodied in a construction which comprises a series of adjustable rollers mounted on a pivoted frame which is supported beneath the point of issuance of the glass, the rollers being positioned to support and guide the tubing along a curved path, the lower portion of which is in substantially horizontal alignment with the usual tube conveyor and drawing apparatus.

Referring to the drawings, a furnace boot or extension 5 is provided with a suitable tube forming means 6. A boot supporting member 8 situated beneath the boot is provided with a pair of brackets 9 which carry a supporting frame comprising a pair of vertically disposed angle irons 11 pivoted at 10 to the brackets. The said supporting frame also includes a second pair of angle irons 12, forming the base. The angle irons 12 are rigidly connected to the vertical angle irons 11 and are supported by braces 13. The angle irons forming the sides of said frame are secured to each other in spaced relation by cross members 13^a.

An adjusting screw 14 has a pivotal connection 15 with the angle irons 11 and is actuated by a hand wheel 14^a for adjustably swinging the frame inwardly and outwardly about the pivot 10.

A plurality of rollers 16^a, 16^b, 16^c, having concave faces 17 adapted to support and guide the tubing "T", are carried in yokes 18, said yokes being mounted for adjustment in brackets 19 supported on cross members 20 secured to the supporting frame. The rollers 16^a, 16^b, and 16^c, are pinned to shafts 21 for rotation thereby which shafts also carry sprockets 22 adapted to receive a chain 23.

A chain tightening arm 24 is pivoted at one end 25 to the upper end of one of the angle irons 11 and is provided at its other end with a sprocket 26, about which the chain 23 passes. A screw 27 pivotally connected to the arm 24 is provided with a hand wheel 27^a for adjusting the tension of the chain 23.

The shaft 21 of the roller 16^c is provided with a second sprocket 28 adapted to receive a chain 29. An electric motor 30, carried by the angle irons 12 furnishes power through chain 29 to rotate the rollers 16^a, 16^b, and 16^c in the direction of movement of the tubing.

A series of rollers 31 (Fig. 1) forming a conventional conveyor are arranged in continuation of the line of the rollers 16^a, 16^b, and 16^c to support the tubing in a substantially horizontal position as the said tubing is drawn.

The operation is as follows: As the glass issues from the feeder 6, in the shape of a tube "T", it is necessary that it be handled with care in order to avoid distortion or changes in shape while in a plastic state. In general practice it is necessary to bend the tube to a horizontal position for greater ease in handling. I provide the series of rollers 16^a, 16^b, and 16^c adapted to guide the tubing while in a plastic state through a long curve until it reaches the horizontal rollers 31. The rollers 16^a, 16^b, and 16^c, are supported on a swinging frame which may be adjusted to any desired position. The roller 16^a is in approximately vertical alignment with the opening from which the glass issues and by adjusting the aforementioned rollers as well as the frame, the curve may be lengthened or shortened correspondingly as the plasticity of the glass changes. When the glass is flowing at a higher temperature or the size of the tube being drawn makes it necessary for it to be cooled longer, the device may be adjusted so that the glass will move downwardly a greater distance before it is deflected to any great extent from a vertical path. This is indicated by the dotted line position in Fig. 1.

The electric motor 30 furnishes power through chain 29 [illegible] sprockets 28 and 22 and chain 23 to the rollers 16^a, 16^b and 16^c, so that their driving surfaces at the points of contact with the glass are thereby driven in the direction of travel of the glass and at the same speed as the glass is moving. The tube is thereby prevented from unduly sagging until it has chilled sufficiently to retain its normal shape.

Modifications may be resorted to within the spirit and scope of the appended claims.

What I claim is:

1. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame pivotally supported beneath said tube former and in close proximity thereto, means for adjustably positioning said frame, a plurality of adjustable rollers mounted on the frame and adapted to in part control the direction of travel of the tube, and means carried by said frame for positively rotating said rollers.

2. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame pivotally supported beneath said tube former and in close proximity thereto, means for adjustably positioning said frame, a plurality of the tube supporting rollers carried by the frame, means for adjusting said rollers transversely of said tube, and means for positively rotating said rollers.

3. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, series of aligned conveyor rollers forming a part of the path of travel of the drawn tubing, a series of adjustable rollers arranged in an arcuate path forming another portion of said path of travel of the drawn tubing, means for adjusting the last named rollers transversely of said path, and means for simultaneously adjusting the entire set of rollers which form the arcuate path.

4. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame pivotally supported adjacent said tube former, a guide roller carried by said frame in substantially vertical alignment with the former, a second guide roller carried on said frame in a plane below the first guide roller and in alignment with said conveyor rollers, means for adjusting said guide rolls transversely of the tubing, and means for rotating said guide rolls.

5. Glass tube forming apparatus including a former from which tubing is drawn, mechanism for applying a drawing tension to the tubing, a series of tube guiding rollers interposed between the former and drawing mechanism, a pivoted frame disposed adjacent the former and supporting certain of the rollers, and means for adjusting the frame about its pivot to thereby change at least a portion of the path of travel of the drawn tubing.

6. Glass tube forming apparatus including a former from which tubing is drawn, mechanism for applying a drawing tension to the tubing, a series of tube guiding rollers interposed between the former and drawing mechanism, a pivoted frame disposed adjacent the former and supporting certain of the rollers, means for adjusting the frame about its pivot to thereby change at least a portion of the path of travel of the drawn tubing, and means whereby the rollers on the frame may be adjusted to change a portion of the path of travel of the drawn tubing.

7. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame pivotally supported adjacent said tube former, a guide roller carried by said frame in substantially vertical alignment with the former, a second guide roller carried on said frame in a plane below the first guide roller and in alignment with said conveyor rollers, and means for adjusting said guide rolls transversely of the tubing.

8. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame supported beneath said tube

former and in close proximity thereto, means carried on the frame providing a series of guiding surfaces arranged at intervals along the path of movement of the tubing and arranged to contact with the tubing as it is drawn and controlling in part the direction of travel of the tubing, means for adjusting the position of said frame and thereby adjustably varying the path of the tubing, and means for individually adjusting the positions of said guiding surfaces and thereby further adjusting the path of travel of the tubing.

9. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame supported beneath said tube former and in close proximity thereto, means carried on the frame providing a series of guiding surfaces arranged at intervals along the path of movement of the tubing and arranged to contact with the tubing as it is drawn and controlling in part the direction of travel of the tubing, means for causing said guiding surfaces to advance with the tubing, means for adjusting the position of said frame and thereby adjustably varying the path of the tubing, and means for individually adjusting the positions of said guiding surfaces and thereby further adjusting the path of travel of the tubing.

10. The combination of a glass tube former, a drawing apparatus arranged to apply a drawing tension to tubing produced by the former, a frame supported beneath said tube former and in close proximity thereto, means carried on the frame providing a series of guiding surfaces arranged at intervals along the path of movement of the tubing and arranged to contact with the tubing as it is drawn and controlling in part the direction of travel of the tubing, means for adjusting the position of said frame and thereby adjustably varying the path of the tubing, means for individually adjusting the positions of said guiding surfaces and thereby further adjusting the path of travel of the tubing, and means for positively advancing said guiding surfaces in the direction in which the contacting tubing is moving and at substantially the rate at which the tubing is moving.

Signed at Alton, Illinois, this 25 day of March, 1931.

LEONARD D. SOUBIER.