

July 24, 1962

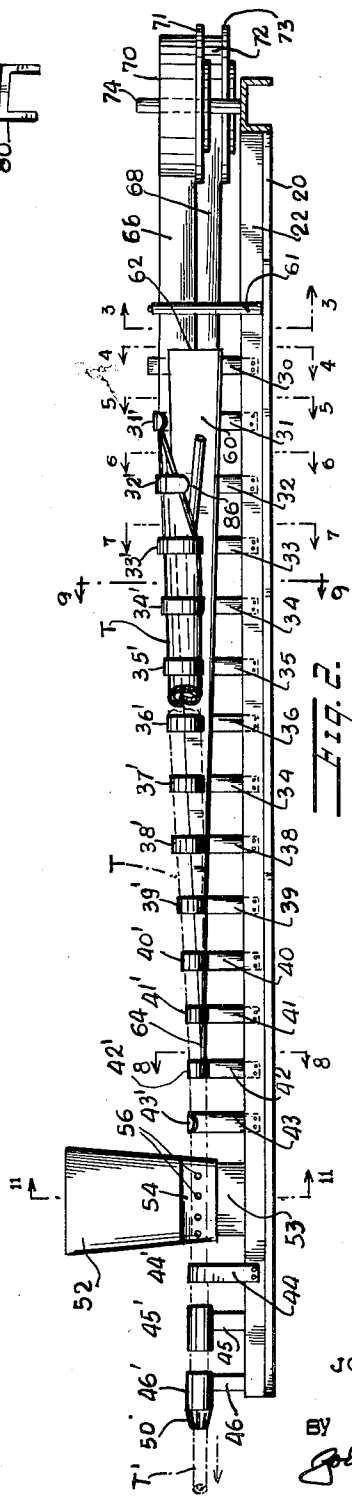
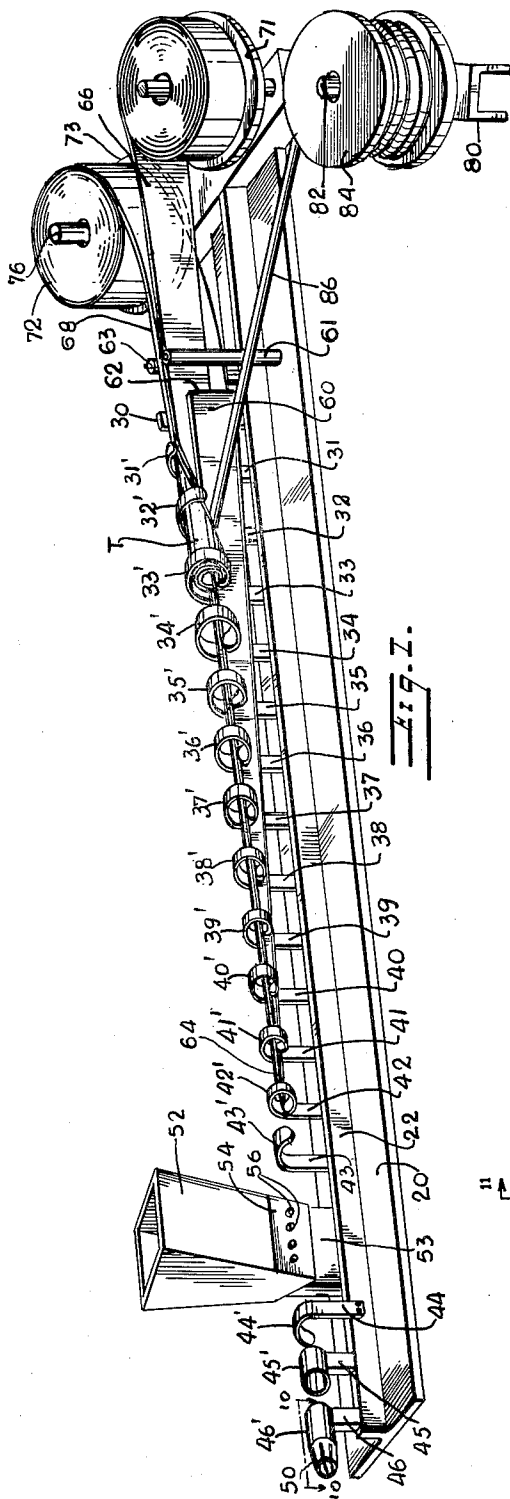
J. P. LO RUSSO

3,045,563

TUBE FORMING DEVICE

Filed June 24, 1960

2 Sheets-Sheet 1



INVENTOR.
JOSEPH P. LO RUSSO

BY
John H. Packer
ATTORNEY

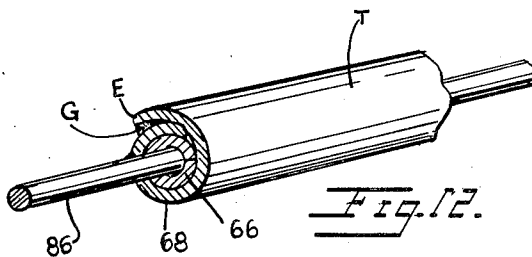
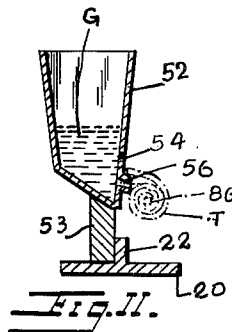
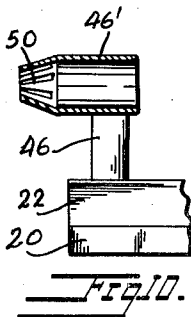
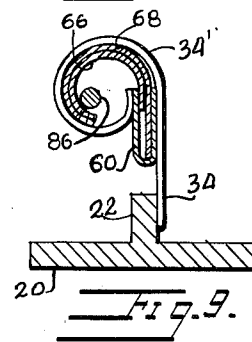
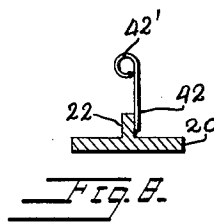
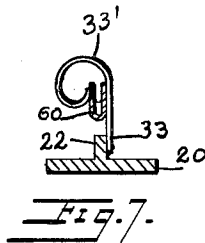
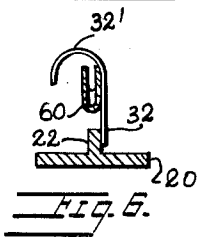
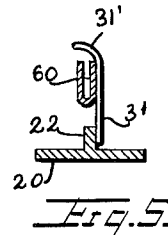
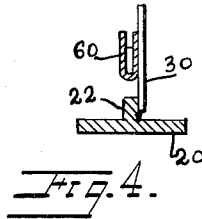
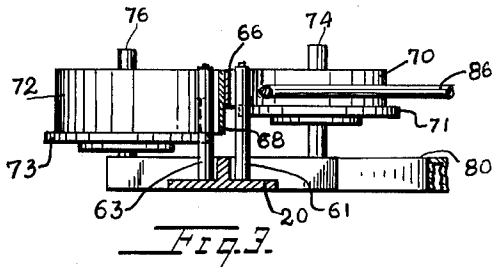
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J. P. LO RUSSO
TUBE FORMING DEVICE

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2 Sheets-Sheet 2



INVENTOR.
JOSEPH P. LO RUSSO
BY *John H. Polach*
ATTORNEY

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3,045,563

TUBE FORMING DEVICE

Joseph P. Lo Russo, Canfield St., Stanhope, N.J.

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1 Claim. (Cl. 93-82)

This invention concerns a tube forming device.

The invention is adaptable to roll a single or multiple layer tube with or without a central core. In one application of the invention, the device is employed to roll a kraft paper tube with a waxed paper liner and with a pyrotechnic fuse core.

One object of the invention is to provide a tube forming device in which one or more flap strips of sheet material are drawn through a succession of eyelets or rings of progressively decreasing diameter until a complete cylindrical tube is formed.

A further object is to provide means for gluing an outer edge of the rolled strips to secure the strips in rolled, tubular form.

Still another object is provision of a device in which a strip of sheet material may be drawn manually or mechanically for forming a rolled tube of indefinite length.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a perspective view of a device embodying the invention.

FIG. 2 is a side elevational view, partly in section, of the device.

FIG. 3 through FIG. 8, and FIG. 11 are sectional views of the device taken on lines 3-3 through 8-8 and 11-11, respectively, of FIG. 2.

FIG. 9 is a sectional view on an enlarged scale taken on line 9-9 of FIG. 2.

FIG. 10 is a sectional view on an enlarged scale taken on line 10-10 of FIG. 1.

FIG. 12 is a perspective view of a portion of a tube formed according to the invention.

Referring to the drawings, there is shown a flat platform 20 provided with an upstanding ridge 22 to which is riveted or welded the bottom ends of a plurality of posts 30-46. The upper ends of posts 31-33 are curved or curled progressively to a greater circular circumferential extent at 31' to 33', so that end 33' defines a substantially complete ring. The upper ends of posts 34-42 form complete rings 34'-42' of progressively smaller diameter. Post 43 has a laterally directed upper curved end 43' laterally directed in the direction of rolling of tube T shown advanced in the device in solid lines as far as ring 33'. Post 44 has an oppositely directed upper end 44' for a purpose to be described later. Post 45 supports a short cylindrical tube 45' and post 46 mounts a short cylindrical tube 46' which terminates in a constricted cylindrical arrangement of spring fingers 50.

Between posts 43 and 44 is a glue pot 52 in which is fitted a plate 54 formed with a plurality of nozzles 56 through which glue G may be discharged upon a tube being drawn past the pot. The pot is supported on post

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53. A material guide 60 is supported by posts 30-42. This guide is formed from a generally triangular piece of metal bent to U-shaped cross section for its entire length from base to apex. The side walls of the guide are thus of progressively decreasing height from the base end 62 to the apical end 64. The guide thus defines a trough with open top and closed rounded bottom.

Guide 60 serves as a support and guide for strips 66 and 68 which are fed from rolls 70, 72 carried on reels 71, 73 and spindles 74, 76. The spindles are supported on a crossbar 80 secured to platform 20 and ridge 22. Another spindle 82 carries a reel 84 wound with a cord 86 which forms a core of the tube T rolled in the device. Guide posts 61, 63 are disposed on opposite sides of ridge 22 in advance of platform 60.

In operation of the device, strips 66 and 68 are threaded between guide posts 61, 63 and into the guide 60. Post ends 31'-33' gradually curl or roll the upper juxtaposed edges of the strips 66, 68 to cylindrical form as shown in FIGS. 1 and 2. Strip 66 is shown narrower than strip 68. Cord 86 is drawn off of reel 84 and passes into the curling ring 33'. There the cord is enclosed by the curled posts forming tube T. The tube T is then drawn through rings 34' to 42' in succession which effect a gradually tighter roll of the tube. At post end 43' the free edge E of the tube is held separate from the body of the tube so that glue G can be deposited in a line on the outer side of the tube through nozzles 56; see FIGS. 11 and 12.

Curled end 44' of post 44 serves to press the free edge E of the tube down on the deposited glue. Short tubes 45' and 46' effect further cylindrical compression of the tube and the constriction defined at fingers 50 complete the compression of the tube around cord 86. The tube, which extends out of constriction 50 at T', can be grasped manually and pulled axially. This will serve to provide the force for continuously drawing the strips 66 and 68 and cord 86 off of the rolls and reel. If desired, this free end T' can be engaged on a motor driven reel (not shown) for drawing and forming the tube T continuously and automatically until the rolls 70 and 72 and cord 86 on reels 71, 73, 84 are exhausted. If desired, cord 86 can be omitted to form a tube T with hollow center. Strip 66 could also be omitted to form tube T from a single strip 68. When forming a fuse for pyrotechnic use, strip 66 may be made of waxed paper and strip 68 may be made of kraft paper, while core 86 consists of ignitable material.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claim.

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

A device for forming a tube from strip sheet material on reels, comprising a support, a series of spaced upright posts on said support, said posts having curved ends of progressively greater circumferential extent for curling the strip material manually fed therethrough, another series of spaced posts, having portions defining rings of progressively smaller diameter in axial alignment on

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said support for shaping the curled strip material manually fed therethrough into a tube of predetermined diameter, an elongated tapered member U-shaped in cross section for guiding the material manually fed through said curved ends and rings mounted on said posts, still another post with curved end on the support beyond said rings for holding a free edge of the tube spaced from the exterior thereof, a glue pot on the support having nozzles disposed to apply glue to the exterior of the tube in a line adjacent to said free edge, and another post with curved end for pressing the free edge of the tube against the applied glue along said line, and a plurality of short

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tubes disposed in alignment for effecting compression of the tube to seal said free edge to the tube, one of the short tubes having an end formed with spring fingers disposed in a constricted ring to shape the glued tube to minimum diameter.

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