A. J. BUHTZ.

HOOP FORMING MACHINE.

APPLICATION FILED OCT 4, 1919.

1,354,951.

Patented Oct. 5, 1920.

3 SHEETS—SHEET 1.

Fig. 1

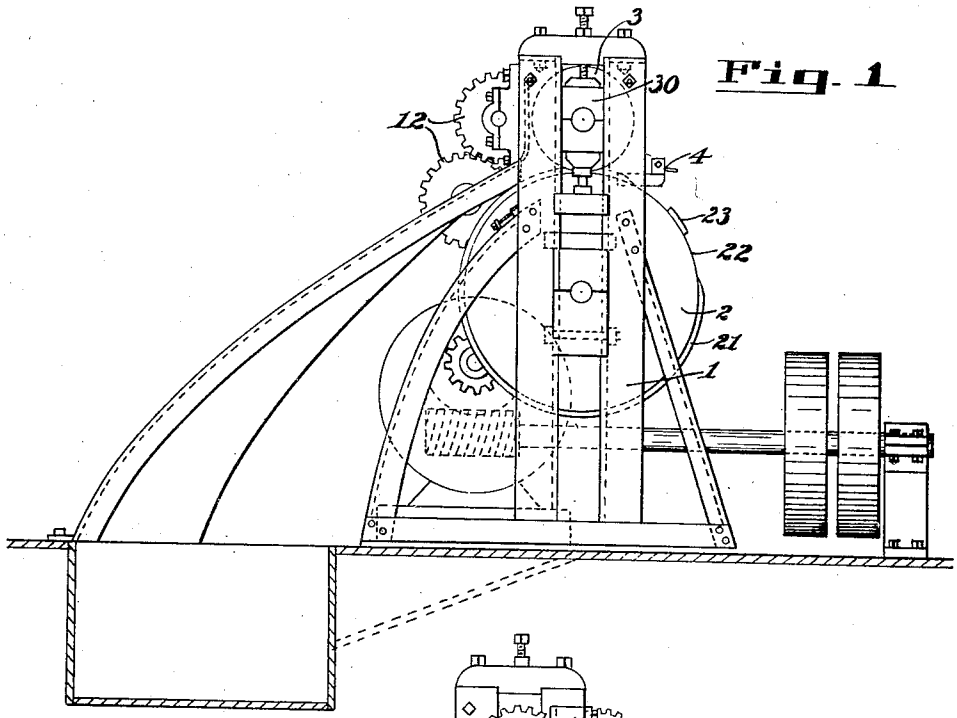
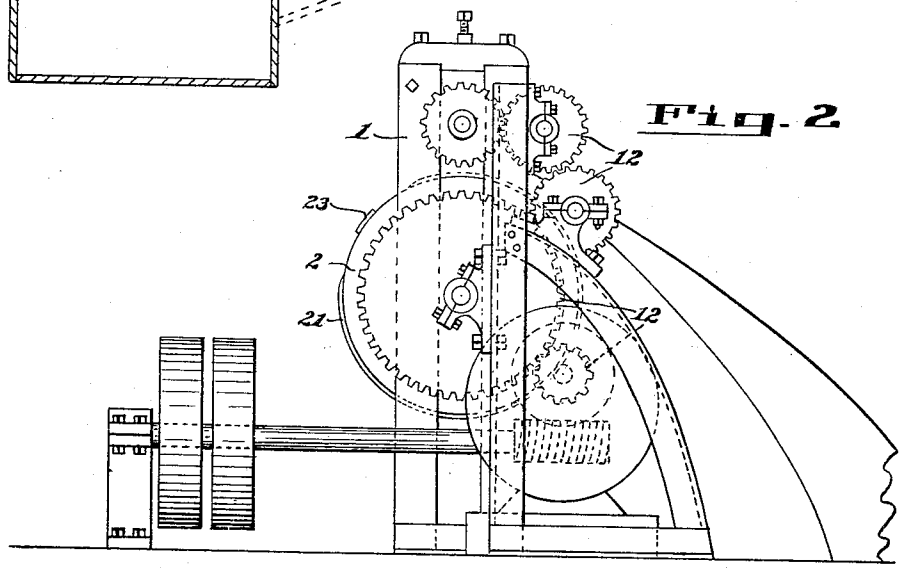


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 3

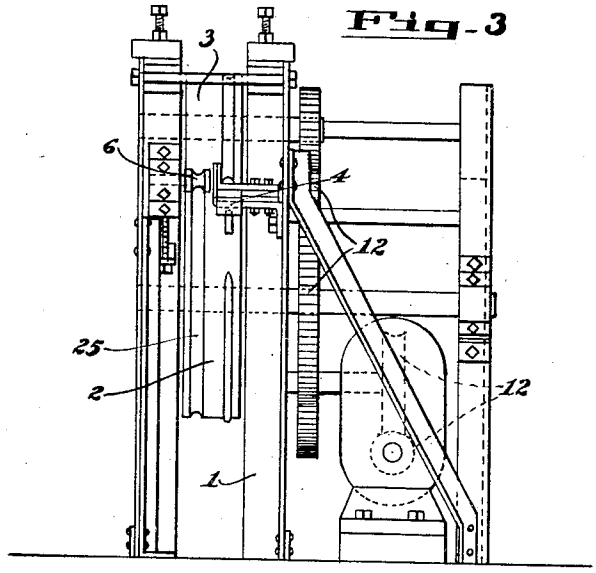


Fig. 5

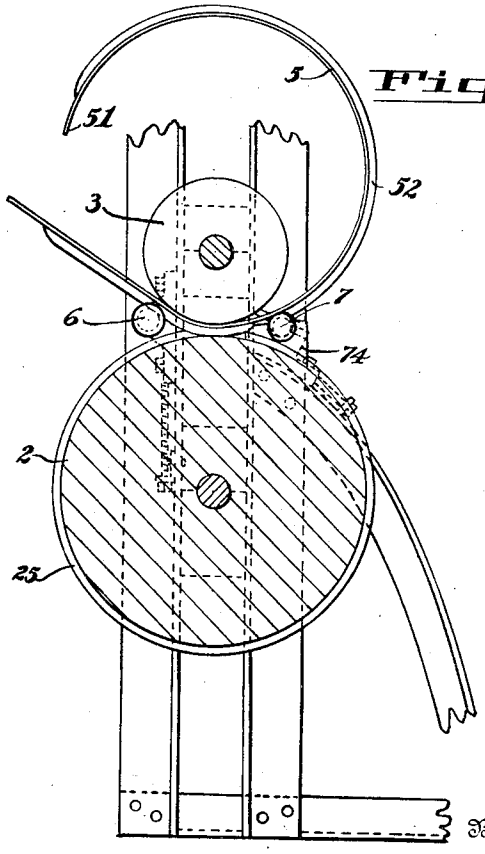
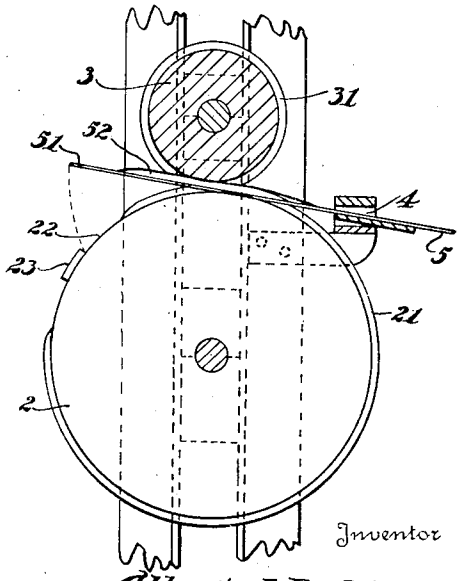


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 6

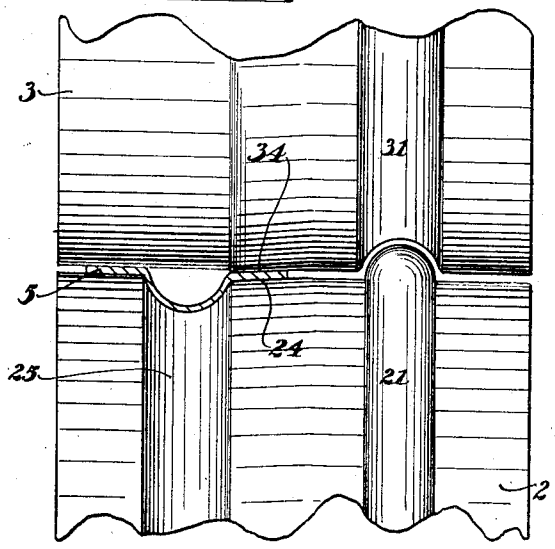


Fig. 7

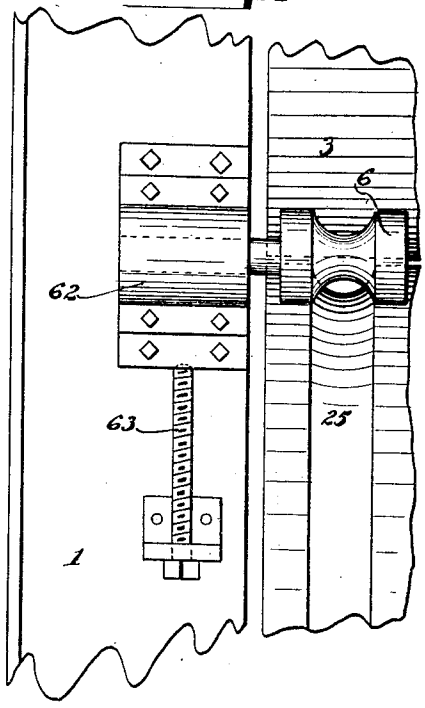


Fig. 8

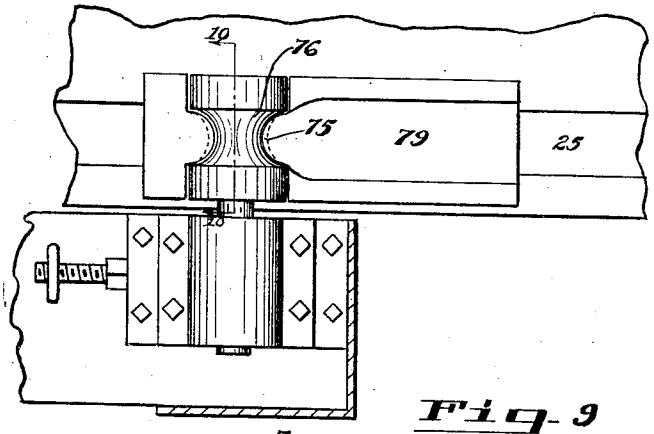


Fig. 10

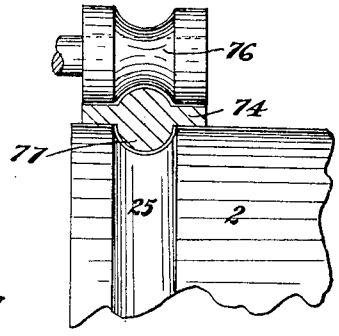
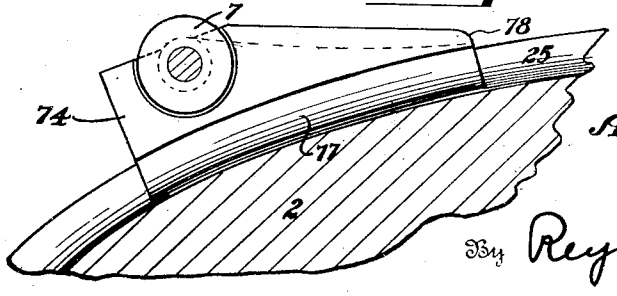


Fig. 9



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UNITED STATES PATENT OFFICE.

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HOOP-FORMING MACHINE.

1,354,951. Specification of Letters Patent. Patented Oct. 5, 1920.

Application filed October 4, 1919. Serial No. 328,555.

To all whom it may concern:

Be it known that I, ALBERT J. BUHTZ, a citizen of the United States, and resident of the city of Seattle, county of King, and State of Washington, have invented certain new and useful Improvements in Hoop-Forming Machines, of which the following is a specification.

My invention relates to hoop-forming machines and is particularly adapted to form hoops of metal for use upon barrels.

The object of my invention is to provide a simple and reliable apparatus for manufacturing a complete hoop of the kind desired from a metal blank, with the exception of riveting the ends.

Another object of my invention is to provide means for producing an up-standing, circumferential reinforcing rib upon a metal hoop, this rib being left flat at its ends to assist in riveting the ends together.

Another object of my invention is to provide an apparatus which, after forming such a rib upon a hoop blank will curve the ribbed blank into approximately the final shape of the hoop.

My invention comprises the novel parts and combinations of parts which are shown in the accompanying drawings, described in the specification, and particularly defined by the claims terminating the same.

In the accompanying drawings I have shown my device embodied in a form which is now preferred by me, though it is apparent that changes may be made in the design and construction thereof, without departing from the scope of my invention.

Figure 1 is an elevation of my device complete.

Fig. 2 is an elevation of the device from the side opposite that of Fig. 1.

Fig. 3 is an end view of my device, looking from the feeding end.

Fig. 4 is a detail, partially in section, of the rib-forming mechanism.

Fig. 5 is a detail, partially in section, of the hoop curving mechanism.

Fig. 6 is a detail showing a portion of the curving mechanism and the means for flaring the hoop, and showing also the rib forming mechanism.

Fig. 7 is an elevation of a part of the curving mechanism.

Fig. 8 is a plan view of the same device.

Fig. 9 is an elevation of the same device, taken at right angles to Fig. 7.

Fig. 10 is a sectional view of the same device shown in Figs. 7, 8 and 9.

In forming a hoop with my apparatus two steps are necessary to form a completed hoop from a metal blank. Generally speaking, the first step consists in forming an upstanding rib upon the blank as it lies in the flat. The second step consists in taking the ribbed bar or sheet and flaring it; that is, bending one flange of the hoop to fit a smaller portion of the barrel, due to the flare thereof outward. At the same time the hoop is curved circumferentially into approximately the desired curvature to fit about the barrel. In carrying out this process I prefer to leave both ends of the hoop uncrimped or flat. This is done in order that the ends may be more conveniently secured together, as by riveting. If the ends are ribbed they do not fit together well, and it is difficult to draw them together, and to make a neat and secure hoop; while if the ends are flat they may be fastened together securely while the remainder of the hoop will have a stiffening corrugation or rib.

In carrying out my invention I provide two rollers mounted in a suitable frame 1, and driven by means of any suitable gear train 12. The base roller 2 is preferably mounted below the pressure roller 3, which coöperates therewith. The two rollers should be spaced just enough to permit the passage of the thickness of the metal to be used in forming the hoop. I prefer to mount the pressure roller 3 in an adjustable or sliding block as shown at 30 in Fig. 1 to permit adjustment for varying thicknesses of metal which may be used. If desired, the base roller 2 may also be so mounted.

The base roller 2 should be of a circumferential extent greater than the length of the blank to be used, and greater than the circumferential extent of the finished hoop. Upon the periphery of this roller 2 is placed an upstanding rib 21. This rib extends only part way about the circumference of the roller, and is interrupted to form a flat portion 22. If desired a placement stop 23 may be positioned upon this flattened surface 22. This acts as a guide against which the entering end of the hoop blank abuts when the blank is fed into the machine. The pressure

roller 3, which is preferably smaller in diameter than the roller 2, has a groove 31 which coöperates with the rib 21 upon the base roller. The stop 23 if used should be adapted to be received within the groove 31. I prefer also to mount a suitable guide 4 upon the frame adjacent the feeding side of the rollers 2 and 3.

In carrying out the first step in forming a hoop the blank is fed between the rollers 2 and 3, which are turning in opposite directions at equal peripheral speeds. The end 51 of the blank 5 abuts against the end of the stop 23. The pressure of the two rollers 2 and 3 feeds the blank 5 forward and as the rib 21 begins to enter the groove 31 the blank is crimped or corrugated to form the rib 52. This is shown in detail in Fig. 4. As the end of the blank passes through between the rolls, the rib 21 passes out of the groove 31 and the last end of the blank is not crimped, as it comes out upon the flattened portion 22 of the roller 2. Thus it will be seen that both ends of the blank are left flat while the portion between the ends is corrugated. The blank then comes out at the delivery side of the machine with its ends flattened and corrugated between its ends and ready for the second step. It is only slightly curved by this corrugating process.

The flaring and curving of the blank is carried out by another portion of the same device. Upon the base roller 2 is cut a groove 25 which is adapted to receive the corrugation or rib 52. A portion 24 of the periphery of the roller 2 adjacent the groove 25 is slightly coned as shown in Fig. 6. The portion of the pressure roller 3 which coöperates with this portion of the roller 2 is flat, except that it has a portion 34 which coöperates with the portion 24 of the base roller which is slightly coned or inclined. As the blank 5 is fed through this portion of the machine the coöperating coned portions 24 and 34 produce the amount of flaring of one flange of the blank which is desired. This flaring makes the circumferential extent of one edge of the finished hoop slightly less than that of the other edge.

I desire to curve the hoop into approximately its finished curvature during this step of the process. To curve the blank I provide a pair of guiding rolls 6 and 7. One of these rolls, 6, is placed at the feeding side of the rollers 2 and 3, and the other 7, at the delivery side. The guiding points, that is the points which make contact with the blank 5, should be to one side of the common tangent to the rollers 2 and 3. Each of these rolls 6 and 7 is provided with a circumferential groove for the reception of the rib 52. Each of them should be mounted in such a manner that they may be adjusted from or toward the common tangent to the rollers 2 and 3. By adjusting them in this manner the amount of curvature given the blank 5 may be regulated. Any suitable means for adjusting these may be used. The means herein shown comprise the sliding bearing block 62, as shown in Fig. 7, and the screw 63 mounted upon the frame 1.

I prefer to mount a shoe 74 between the roll 7 and the roller 2. This shoe is provided with a semi-circular rib 75 which embraces the groove 76 in the roller, and with another rib 77 which fits into the groove 25 on the roller 2. The toe 78 of the shoe fits well into the groove 25 and acts to guide the entering end 51 of the blank up and over the roll 7. I prefer also that the shoe 74 be provided with a groove 79 to accommodate the rib 52. The groove 79 should be slightly curved to accommodate the curvature of the hoop being formed.

To curve the blank 5 after the rib 52 and the flattened ends have been formed thereon, it is fed between the rollers 2 and 3, fitting the rib 52 into the groove 25. The coned portions 24 and 34 of the two rollers gives the hoop a slight flare and the action of the rolls 6 and 7 in combination with the rollers 2 and 3 gives the hoop the desired amount of curvature. This may be seen in Fig. 5. The toe 78 of the shoe 74 guides the entering end 51 of the hoop over the roll 7 as hereinbefore described. To vary the amount of curvature given the hoop, the rolls 6 and 7, or one of them, may be adjusted from or toward the common tangent to the rollers 2 and 3 as has been described.

By means of this apparatus a complete hoop except for rivets may be formed from a metal blank with only two operations. The curvature given the hoop may be regulated and the hoop is corrugated to give it strength and to form a surface upon which the barrel may be rolled in use.

What I claim as my invention is:

1. In a hoop-forming machine, in combination, a pressure roller having a continuous crimping peripheral groove, a base roller having a crimping peripheral rib coöperating therewith, said crimping rib upon the base roller being interrupted to form the ends of a hoop without crimping, a stop upstanding from the interrupted portion of the base roller adapted to receive the end of an entering hoop, a guide adapted to encircle a hoop blank, and positioned near the point of tangency of said rollers, and means for turning said rollers in opposite directions.

2. In a hoop forming machine, means for curving a hoop blank comprising two rollers, a pair of guiding rolls, one fixed at the feeding side and the other at the delivery side of the tangent point of the two rollers, in the path of the hoop blank, the guiding points upon said rolls being positioned to one side of the common tangent of said

rollers and a shoe having supporting engagement upon the surface of one roller at the opposite side of the common tangent and embracing the guiding roll at the delivery side.

3. A hoop forming mechanism comprising two rolls, one having a groove extending entirely therearound with straight surfaces projecting laterally and in the same transverse plane, from each side of said groove the other roll having a projecting rib entering said groove, said latter roll having laterally extending straight surfaces opposed to the corresponding surfaces of the first named roll, said rib being interrupted throughout a part of the circumference of the roll by which it is carried and a stop for the hoop ends located between the ends of and in circumferential alinement with said rib.

4. A hoop forming machine comprising two complemental rollers, one being of greater circumferential extent than the length of the hoop and having a projecting groove-forming rib of less length than the length of the hoop and also having a hoop end stop located between the ends of said rib and in circumferential alinement therewith, the other roller having a continuous groove receiving said rib and stop, the surfaces of said rollers at the sides of said groove and rib being adapted to engage the side margins of the hoop while being ribbed.

Signed at Seattle, Washington, this 27th day of September, 1919.

ALBERT J. BUHTZ.