

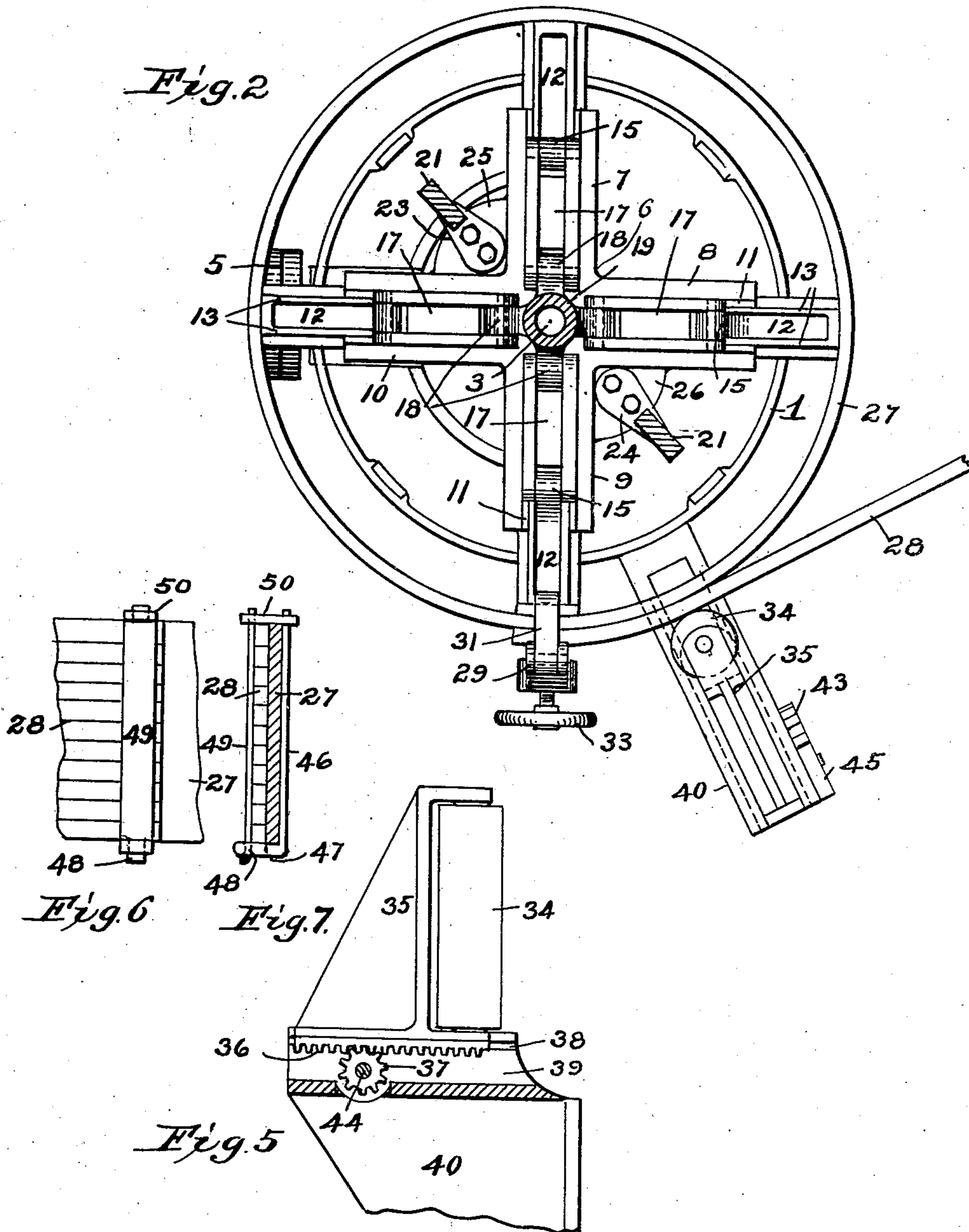


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PATENTED JULY 28, 1908.

J. R. HARDMAN.  
HOOP BENDING MACHINE.  
APPLICATION FILED AUG. 8, 1907.

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# UNITED STATES PATENT OFFICE.

JOHN R. HARDMAN, OF COLUMBUS, OHIO.

## HOOP-BENDING MACHINE.

No. 894,268.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed August 8, 1907. Serial No. 387,736.

*To all whom it may concern:*

Be it known that I, JOHN R. HARDMAN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Hoop-Bending Machines, of which the following is a specification.

My invention relates to improvements in hoop bending machines and comprises the use of a band about which the hoops are bent which is separable from the machine with the hoops bent thereon in place, whereupon a new band may be placed upon the machine and hoops may be bent upon it in the same manner, whereupon it may also be removed from the machine; further, I employ for the purpose of positioning the band about which the hoops are bent, an expansible construction which may be contracted and expanded radially to form a circle of any circumference desired.

Hoops are to be formed of different sizes, and my improvement permits the use of a band of any circumference desired with my holding arrangement, the latter being constructed to be expanded into engagement with the band to hold the same until the hoops are bent thereon, whereupon it may be contracted and the band lifted off and placed aside.

Further, it includes improved means for maintaining the strips to be bent into hoops in place, and also improved means for bringing the strips into engagement with the band as the latter is rotated.

My invention also comprises improved means for securing the ends of the formed hoops in place upon the band when the latter is lifted from the machine.

With these and other objects in view, reference is made to the accompanying drawings, in which

Figure 1 is an elevation of my machine partly in section; Fig. 2 is a plan of the radial frame containing the expansible and contractible construction; Fig. 3 is a side view of the device for maintaining the ends of the strips to be bent in place upon the forming band; Fig. 4 is a face view of the same from the inner side; Fig. 5 is a side view of the rack and pinion for positioning the roller which bends the strips as the frame is rotated; Fig. 6 is a front view of a device for securing the oppo-

site ends of the hoops upon the forming band; Fig. 7 is a side view of the device shown in Fig. 6.

In the drawings in which the same numerals indicate the same feature of construction throughout, 1 denotes the framework of the machine upon which is mounted a bevel gear 2, in which is fixed the shaft 3, said bevel gear 2 being driven by the bevel pinion 4 mounted upon the inner end of a shaft upon the outer end of which is mounted the pulley 5, which may be driven in any desired manner. The shaft 3, at its upper end passes through the frame 6, the latter being rotatably secured to said shaft, and having the radial guideways 7, 8, 9, and 10; these guideways are slotted as shown at 11, and in each of these slots is mounted a radial arm 12, to slide inwardly and outwardly therein, said arm having at its outer end the wide portion 13, upon the lower end of which there is provided an extension 14. In the drawings there are 4 of the radial guideways shown, in each of which is adapted to slide a radial arm 12, and these radial arms are formed in substantially the same manner.

Each radial arm is provided with the lug 15, having an opening 16 therethrough to which is connected one end of the link 17, the other end of the link being pivotally secured to a collar 18 loosely surrounding the shaft 3; adjacent its upper end, the collar is internally threaded as shown at 19 for the purpose of receiving a threaded screw 20, which is mounted in the frame 21, and has at its upper end a hand wheel 22 for the purpose of operating the screw in either direction as desired. Said frame 21 is mounted upon the frame 6 at points 23 and 24 as shown in Fig. 2, in any manner desired, but as shown in said figure it is mounted upon webs 25 and 26 interposed between the radial arms of the frame 6. With this construction, upon the turning of the wheel 22, the links 17 will be drawn upwardly and thereby the arms 12 will be drawn inwardly, which operates to produce a circle with decreased diameter; if the wheel be turned in the opposite direction, the inner ends of the links will be lowered, which will have the effect of driving the arms 12 outwardly, thereby increasing the diameter of the circle. This inward and outward movement is capable of fine adjustment, so that a circle of any circumference desired



within the limits of the machine, may be formed, making it easy to adapt the machine to a forming band of any size.

A band 27, of the desired circumference, having been selected, the radial arms are adjusted properly to receive said band, which is laid upon the projections 14 on the outer faces of the widened portions 13 of the arms 12; the band having been properly positioned, the hand wheel is given an extra turn for the purpose of engaging the inner face of the band and the outer faces of the arms 12, whereby the band is firmly held in place. Everything is now ready for the positioning of the strips 28 which are to be bent into hoops.

As shown in Fig. 1, the strips 28 to be bent are usually narrow, so that a plurality of them may be placed side by side against the outer face of the forming band 27; when they are positioned, the locking clamp device 29, which is pivotally mounted at its lower end at 30, is swung upwardly across the ends of the strips 28, and the pivoted hook member 31 at the upper end of the clamp 29 is swung over the top of the uppermost strip and the band and permitted to engage the latter upon its inner face, thereby securing the clamp upon the band. The clamp 29, as shown, presents a convex face outwardly, leaving between the clamp and the ends of the strips 28 a space, in which is positioned a member 32 adapted to lie directly against the ends of the strips; a hand wheel 33 passing through the clamp 29 is secured at its inner end in the member 32, and as the hand wheel is turned inwardly or outwardly, said member 32 is driven into engagement with the ends of the strips or is withdrawn from engagement therewith, at the will of the operator. With this construction any degree of pressure desired may be exerted upon the ends of the strips. If it is desired to release the ends of the strips, the hand wheel 33 is turned outwardly, thereby withdrawing the member 32 from engagement with said strips, whereupon the hook 31 may be released, and the whole clamp construction 29 be swung outwardly upon the pivot 30.

To maintain the strips in contact with the band as the latter is rotated through the actuation of the shaft 3, as described, I provide the roller 34 mounted vertically in a bracket 35, said bracket having a rack 36 formed upon its lower face, and a pinion 37 is adapted to engage with said rack, to move said bracket and roller inwardly or outwardly in a radial direction as desired. The bracket 35 is mounted in a grooved slideway 38 formed in the passageway 39 in the upper end of a bracket member 40, the latter being secured to the general frame-work 1 of the machine, at the points 41 and 42. The pinion 37 is mounted in the passageway 39 to rotate freely therein, and is provided for the pur-

pose of giving the bracket 35 a uniform travel inwardly and outwardly, the bracket 35 being actuated preferably by hand. The bracket 35 is maintained in any desired position by means of the ratchet 43 mounted upon the shaft 44 which also carries the pinion 37, the dog 45 being adapted to engage said ratchet and lock the same.

The radial frame having been adjusted to the proper diameter and the appropriate band 37 being positioned, the ends of the strips 28 are brought beneath the clamp member 29 which is thereupon swung into its locking position and the inner member 32 brought into snug engagement with the strip, the roller 34 is moved forwardly in the manner described to force the strips into engagement with the circumference of the band, whereupon the frame is rotated and the strips are bent as shown in Fig. 2. The rotation having been completed, the ends of the strips are brought into juxtaposition, whereupon the wide clamp member 46 is positioned against the inner face of the band; this clamp member 46 has the angular arm 47 thereon at its lower end, the latter being provided with the opening 48 therethrough; into this opening is adapted to be inserted from above the member 49, which is pressed into engagement with the faces of the strips adjacent their ends, and when properly positioned with respect to the member 46, the ring 50 is dropped over their upper ends whereby they are held in close engagement with the faces of said band and strips. Preferably the strips 28 are positioned upon the band in such manner that their ends project slightly beyond the clamp 29, so that when the band is completed, the clamp member 46 may be positioned to cover both ends of the strips, and thereby hold them securely upon the band when the latter is removed from the machine. The roller bracket 35 is now retracted, the clamp member 29 is released, and band 27 with its load of strips now bent into hoops may be lifted off the machine over the frame 21 and placed aside so that the strips may have time in which to adjust themselves to their new form. Another band, of different diameter if desired, may then be placed upon the machine, and the latter properly adjusted thereto, and bending may proceed as before.

The construction herein described may be varied in detail, the essential features of my improved machine being the use of the radial adjustable arms to engage a removable band to which the strips may be bent, the improved means for positioning and maintaining a roller in engagement with said strips, the clamp constructions for maintaining the ends of the strips in proper position, and the rotation of the radial frame construction to give the strips a circular form.

With my improved apparatus, wooden



strips may be bent easily and effectively, and the machine is simple in its construction and operation, and does not comprise parts which are readily put out of order in use.

5 What I claim is:

10 1. A hoop bending machine comprising a supporting framework, a rotary shaft carried thereon, a frame mounted on said shaft and rotatable therewith and having radial arms, radially movable members mounted on said arms, link members connected with said radially movable members at one end thereof and at the other ends with a vertically adjustable collar, whereby said radially movable members may be moved outwardly or withdrawn inwardly, a band adapted to be positioned on the outer faces of said radially movable members, and to be engaged and positively held in position by said members, said band being adapted to receive a strip, and means for fastening one end of said strip and additional means for urging said strip into engagement with said band as the latter is rotated by said shaft.

25 2. A hoop bending machine comprising a shaft rotatably mounted, a frame carried on said shaft, radially adjustable arms carried in said frame, a collar loosely carried on said shaft, link connections between said collar and said radially adjustable arms, a screw for elevating or depressing said collar whereby said radially adjustable arms are drawn inwardly or moved outwardly, extensions on said radially adjustable arms, a band adapted to be positioned on said extensions, whereupon said arms may be moved outwardly by the manipulation of said collar to engage said band and maintain the same in position, said band being adapted to receive on its outer face a plurality of strips to be bent, an adjustable fastening device mounted upon

one of said arms, adapted to engage one end of said strips, means for rotating said shaft to rotate said band, and an adjustable roller arranged to engage said strips and maintain the same in contact with said band as the latter is rotated, and additional fastening means for securing the other ends of said strips when the same are bent upon said band.

30 3. In a hoop bending machine, a frame rotatably mounted, arms positioned upon said frame to be radially movable thereon and having projections on their outer faces, a band adapted to be positioned upon said projections, a collar, a screw adapted to manipulate said collar to raise or lower the same, links connecting said collar with said arms, whereby said arms are adapted to be moved outwardly to engage said band to position the same, and to be withdrawn inwardly to release said band to permit the removal of the same, said band being adapted to have applied to its outer face strips to be bent, adjustable clamping means mounted upon one of said arms adapted to maintain one end of said strips in engagement with said band, an adjustable roller adapted to engage said strips to conform the same to the contour of said band, means for locking said roller in any desired position, means for rotating said frame, and a second clamping device adapted to secure the opposite ends of said strips upon said band whereupon said first clamping device may be released from said band and said band may be removed.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN R. HARDMAN.

Witnesses:

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GEO. W. RIGHTMIRE.