

Sept. 4, 1923.

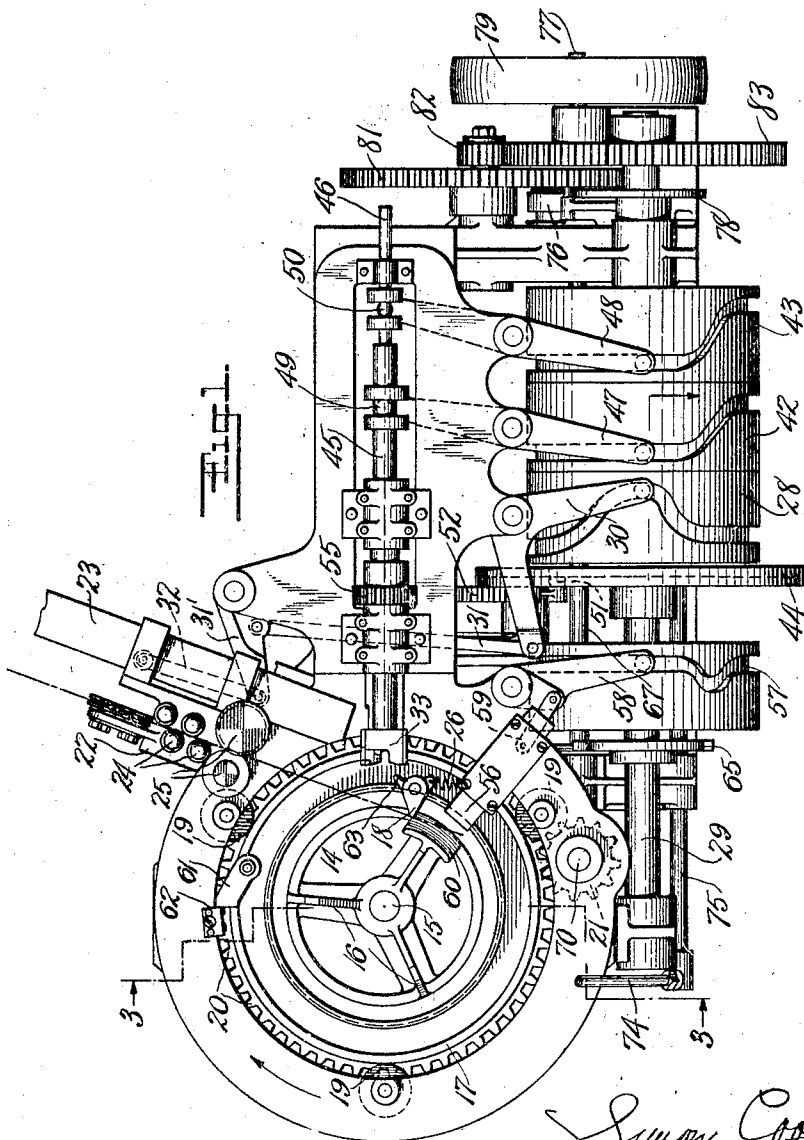
1,466,700

S. COOPER

MACHINE FOR HOOPING PAIRS

Filed Aug. 11, 1919

4 Sheets-Sheet 1



Simon Cooper
Inventor
By Atty.
Frank J. Kent

Sept. 4, 1923.

1,466,700

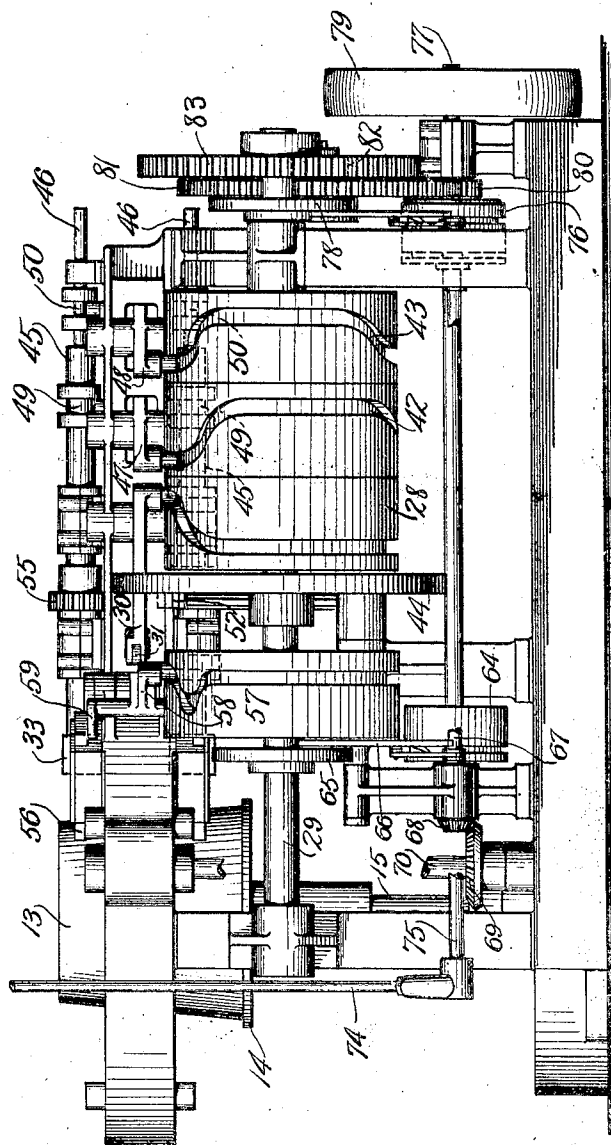
S. COOPER

MACHINE FOR HOOPING PAILS

Filed Aug. 11, 1919

4 Sheets-Sheet 2

Fig. 2.



Simon Cooper
Inventor
By his Atty
Frank G. Kent

Sept. 4, 1923.

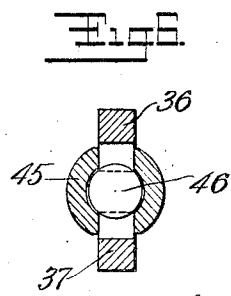
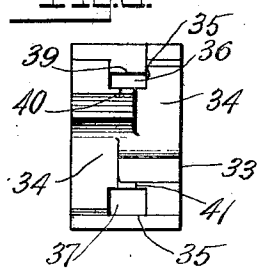
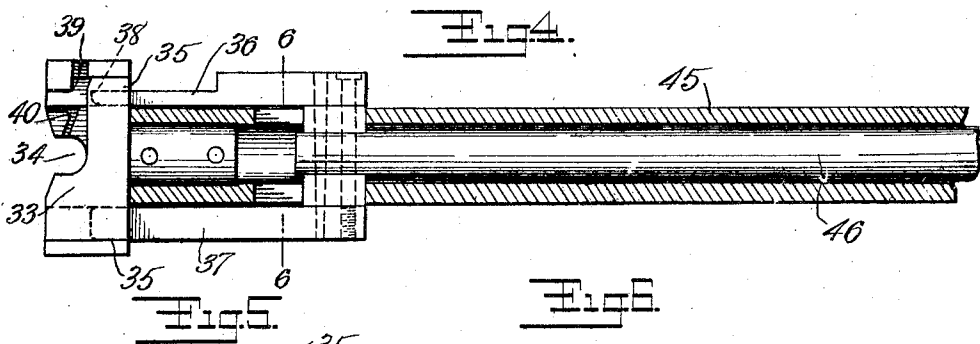
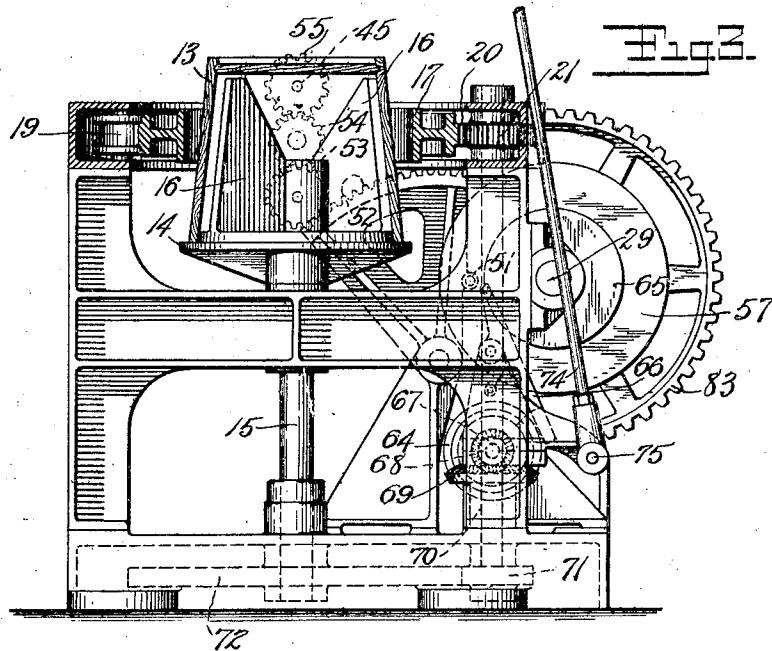
1,466,700

S. COOPER

MACHINE FOR HOOPING PAILS

Filed Aug. 11, 1919

4 Sheets-Sheet 3



Simon Cooper
Inventor
By Atty
Frank J. Kent

Sept. 4, 1923.

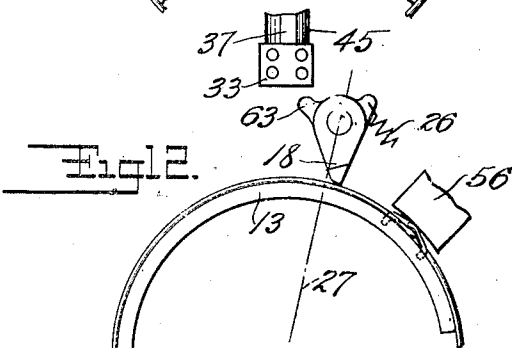
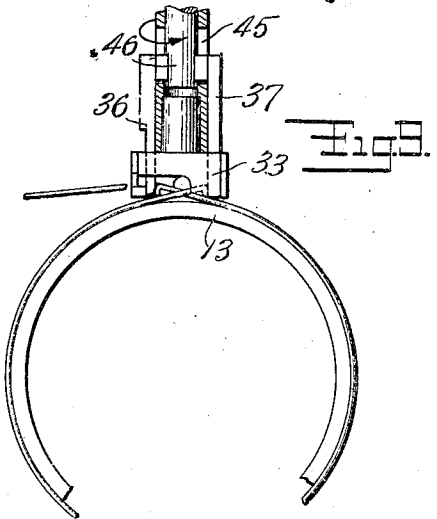
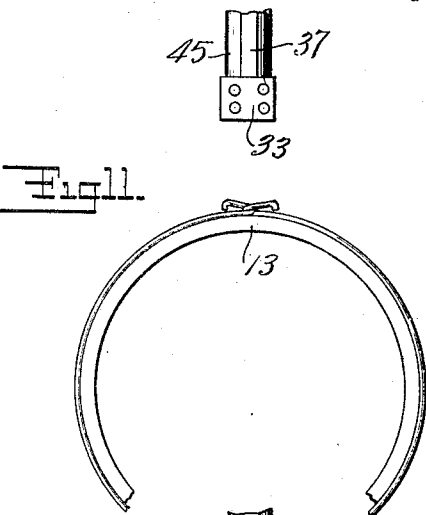
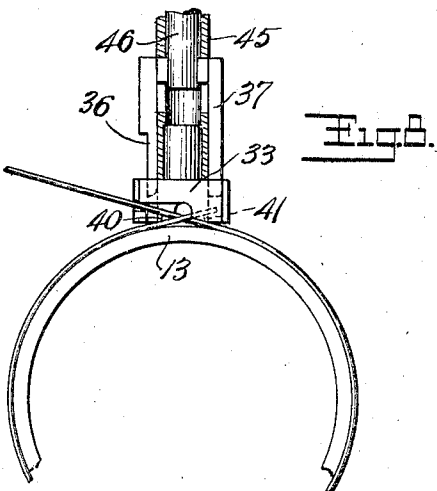
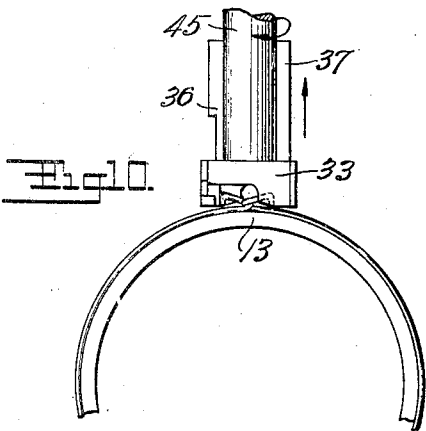
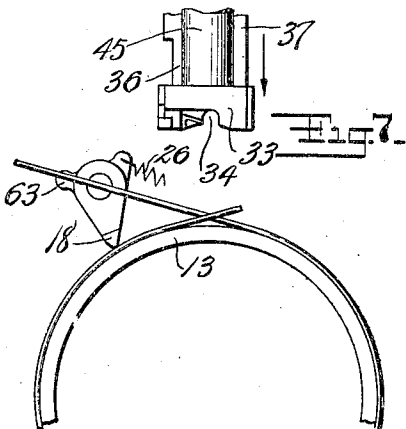
1,466,700

S. COOPER

MACHINE FOR HOOPING PAILS

Filed Aug. 11, 1919

4 Sheets-Sheet 4



Inventor
S. Cooper
By his Att'y
Frank J. Kent

UNITED STATES PATENT OFFICE.

SIMON COOPER, OF BROOKLYN, NEW YORK, ASSIGNOR TO MENASHA WOODEN WARE COMPANY, OF MENASHA, WISCONSIN, A CORPORATION OF WISCONSIN.

MACHINE FOR HOOPING PAILS.

Application filed August 11, 1919. Serial No. 316,828.

To all whom it may concern:

Be it known that I, SIMON COOPER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Hooping Pails, of which the following is a specification.

My present invention relates to the manufacture of pails, particularly the application of the hoops, the general objects of the invention being to apply the hoops under tension and to form the hoops directly on the pail. Accompanying objects are to accomplish the same rapidly and economically and in a simple and practical way.

In a preferred embodiment of the invention, the material for the hoops is supplied from a continuous strip of wire, the end of which is attached to the pail, which is thereupon rotated to wrap the wire under tension about the pail. This measured length of wire is then severed and secured in the form of a hoop by twisting the end portions together and driving the extreme ends into the body of pail, the latter serving to positively prevent untwisting.

Various other features of the invention, including details of mechanism for performing the several operations are disclosed in the accompanying drawings, and will be clear from the following specification.

In said drawings, Figure 1 is a plan view of a machine constructed in accordance with and embodying the invention; Figure 2 is a front elevation of the same, with portions broken away to reveal other parts; Figure 3 is a part sectional and end elevation, taken substantially on the plane of line 3—3 of Figure 1; Figure 4 is an enlarged and partly broken sectional view of the twisting and cutting head; Figure 5 is an end view of the same; Figure 6 is a sectional view on substantially the plane of line 6—6 of Figure 5; Figures 7 to 12 are fragmentary detail views illustrating successive steps in the formation of the hoops.

The pail, which is indicated at 13, in Figures 2 and 3, is placed on a support in the nature of a table 14, mounted on an upright shaft 15 and carrying upstanding radial webs 16 to fit the inside of the pail. Surrounding this support is a ring 17, carrying a pivoted dog 18 for clamping the end of the wire (Figures 1 and 7) against the

side of the pail, said ring being supported by suitable rollers 19 and being provided with gear teeth 20 in its periphery engaged by a driving pinion 21. The supply of wire is mounted on a carriage 22, sliding on a support 23 and provided with wire straightening rolls 24 and wire gripping and grinding rolls 25. At the commencement of operations this wire carriage advances toward the pail support to project the extending end of the wire beneath the point of the wire gripping dog and between the same and the side of the pail. The gripping point of this dog is forced toward the pail by a spring 26 and engages the wire at a point forward of a radial line 27 passing through the centres of the pail support and dog so that the forward rotation of the dog with the pail will suffice to clamp the wire to the side of the pail or within a shallow groove which is sometimes formed in the side of the pail. The forward advancement of the wire carriage is accomplished by a cam 28, on shaft 29, working a bell crank lever 30, which is connected by a link 31, with a rocking lever 31', connected by a link 32, to the wire carriage, said cam operating to retract the carriage after the dog has taken hold of the wire.

The pail support and gear ring rotate in synchronism and the operation of these parts is halted at a point substantially corresponding to the position indicated in Figure 7, where a complete turn of wire has been wrapped about the pail and the overlapping portions of the wire have been brought into position beneath the twisting and severing head. This twisting head consists of an anvil element or head proper 33, which is advanced from the position shown in Figure 7 to the position shown in Figure 8 to grip the crossed wire ends against the body of the pail, said head being open at opposite sides as indicated at 34 in Figure 5, to receive the crossed wire ends. Guides 35 are provided at the opposite sides of this head for slides 36 and 37, slide 36 having a cutting edge 38, cooperating with the cutting edge 39 on the head to sever the wire (Figure 9) and the respective slides cooperating at their inner edges with bending shoulders 40 and 41 on the head. The head is given a slight rotary movement in the direction of the arrow in Figure 9 just after it has passed over the crossed ends of the

wire and before it has firmly gripped the wire against the pail, to carry the bending shoulders beneath the ends of the wires (Figure 8), the slides then operating, one (36) to sever the wire and both, to bend the ends of the wire toward the pail (Figure 9).

The head is then turned from the position shown in Figure 9 to the position shown in Figure 10 to twist the ends of the wire together, the bent ends, gripped as they are, over the bending shoulders, serving meanwhile to prevent back-slip of the wire in the twisting head and the twisting resulting in a greater tightening of the thus-formed hoop upon the pail. After these operations the twisting head is retracted, as indicated in Figure 11.

The several movements of the twisting and severing mechanism are accomplished by cams 42, 43 and 44, cam 42 operating to advance and retract the tubular shaft 45 which carries the anvil element of the twisting head, cam 43 operating to advance and retract the shaft 46, which carries the slides or bending fingers and which works within the tubular shaft 45, and cam 44 imparting the necessary rotary movements to the head. All of these cams are mounted on the shaft 29. The first two of these cams are connected by rocking levers 47 and 48, with the tubular shaft 45 and inner shaft 46 at 49 and 50, and the third cam 44 is engaged by a cam roller 51 on the gear segment 52, which meshes with a gear 53, in mesh with a gear 54, which latter, in turn, meshes with a gear 55 on the tubular shaft 45.

The lower gear 53 is mounted on a shaft corresponding to the twisting head shaft 45 and forming part of a duplicate twisting mechanism for simultaneously securing a second hoop wire to the lower portion of the pail. In similar fashion the cam levers 47 and 48 are provided with downward extensions for operating the lower twisting head, a second wire feeding carriage is provided beneath the first carriage and a clamp dog is provided on the under side of the gear ring for the second hoop wire. These duplicate elements appear in part in Figure 2 and are given corresponding reference characters.

The next step in the hoop forming operation is to drive the inwardly bent ends of the hoop wire into the body of the pail. For this purpose the pail support is given a slight further advancement to carry the hooked ends of the wire beneath a slide 56, which acts as a hammer, and as indicated in Figure 12 to clinch the bent ends firmly in the body of the pail. This locks the twisted ends of the wire together, preventing untwisting, secures the hoop in fixed position on the pail, and disposes of the ends in such a way that they cannot injure hands or clothing in the subsequent handling of the

pail. The hammer slide is operated at the proper time by a cam 57, on shaft 29 and connected with the slide through the passageway of rock lever 58 and link 59 and co-operating with the hammer, at the inside of the pail is an anvil 60, which is shown carried by one of the positioning ribs 16. Backward rotation of the parts is prevented while the hammer is operating, by a holding pawl 61 on the gear ring arranged to engage a relatively stationary stop shoulder 62.

After the clinching or stapling operation just described, the twisting head is again advanced by its cam mechanism, to engage a lug 63 outstanding from the rearward side of the clamping dog to thereby trip said dog from holding engagement with the hoop wire, whereupon the completely hooped pail is then free to be removed from its form or support. It will be noted that in clamping the wire to the pail, this dog also acts to hold the pail firmly against its support.

The intermittent rotation of the pail support is accomplished in the present disclosure by means of a clutch 64, controlled from a cam 65 on the cam shaft 29, by a lever 66, said clutch, serving when coupled, to transmit motion from the shaft 67 on which it is mounted, through bevel pinion 68 and bevel gear 69, to upright shaft 70, which carries a gear 71, at its lower end, meshing with a gear 72 on the lower end of the upright pail support shaft 15 and the pinion 21 at its upper end, in mesh with the teeth of the gear ring. The machine is thrown into operation by means of a lever 74 on the end of a shaft 75, which serves to throw in the pin of a one-revolution clutch 76, on the main power shaft 77. At the end of a complete cycle of operations, when the pail support, gear ring and cam shaft have each made a complete revolution, a cam 78, on the cam shaft releases the pin of the one revolution clutch and the parts come to rest in position ready to receive and operate upon another pail.

Power is supplied to the machine, in the present instance, by means of a pulley 79, on the power shaft 77, said shaft carrying a pinion 80, in mesh with a gear 1, which carries a pinion 82 in mesh with a gear 83 on the cam shaft.

It will be seen that with my invention the hoop wire is automatically applied and secured to the pail with a firm, even tension and that the joints produced are of a lasting, permanent character, free of objectionable points or the like. The mechanism employed is subject to modification, as will be understood, to meet various requirements and this without departing from the spirit and scope of the invention, as hereinafter claimed. I wish it to be further understood that the terms employed herein, except for the requirements of the prior art, are used

in a descriptive rather than in a limiting sense.

I claim:—

1. In a machine for hooping pails, the combination with a pail support, of means for clamping a wire end against the side of the pail, means for simultaneously rotating said pail support and the wire clamping means to wrap a length of wire about the pail, and means for securing the ends of the wire together while on the pail.

2. In a machine for hooping pails, the combination with a rotating pail support, of means for feeding wire from a source of supply, means for clamping the free end of the wire against the side of said pail, supplying a measured portion of wire to the rotating pail and severing said measured portion from the balance of the wire.

3. In a machine for hooping pails, the combination with a rotating pail support, of means for feeding wire from a support, a member arranged concentrically about the rotating pail support and provided with means for clamping one end of the wire against the side of the pail, means for simultaneously moving the pail support and the concentrically arranged member to supply a measured length of wire to the rotating pail, severing said measured length of wire from the balance of the wire on the support, and means for securing together the ends of said severed length of wire to form a hoop upon the pail.

4. In a machine for hooping pails, the combination with a rotating pail support, of a supply of wire, means for clamping the free end of the wire against the side of the pail on the rotating support, thereby withdrawing wire from said supply by rotating said support and wrapping the wire about a pail on the support, and means for severing the wrapped section from the balance of the wire and for securing the wrapped section as a hoop upon the pail.

5. In a pail hooping machine, means for wrapping a length of wire about a pail, means for twisting the ends of said length of wire together into a hoop on the pail, and means for driving the ends of said wire into the material of the pail.

6. In a pail hooping machine, means for wrapping a length of wire about a pail, means for twisting the ends of said length of wire together into a hoop on the pail, means for bending the ends of said length of wire into hooks and means for driving said hooked ends into the body of the pail.

7. In a pail hooping machine, means for wrapping a length of wire about a pail, means for twisting the ends of said wire together and for forming said end portions into hooks, and means for driving said hooked ends into the body of the pail.

8. In a pail hooping machine, a twisting

head provided along its opposite sides with entrance slots leading in from the face thereof for the insertion of crossed wire ends, bending shoulders in said head adjacent the inner ends of said slots for supporting the ends of the crossed wires when said head is given a slight axial turn, and bodily movable slides on said head disposed to bend the ends of the crossed wires over the bending shoulders.

9. In a pail hooping machine, a twisting head having a pair of bending shoulders arranged therein, entrance slots at opposite sides of the head leading in from the lower face of said head and communicating with said shoulders, and bodily movable slides on said head to bend the ends of an inserted cross wire over the bending shoulders.

10. In a pail hooping machine, a twisting head provided along its opposite sides with entrance slots leading in from the face thereof for the insertion of crossed wire ends, bending shoulders in said head adjacent the inner ends of said slots for supporting the ends of the crossed wires when said head is given a slight axial turn, bodily movable slides on said head disposed to bend the ends of the crossed wire over the bending shoulders, and means for rotating the head to twist the crossed wire ends together.

11. In a pail hooping machine, a twisting head provided along its opposite sides with entrance slots leading in from the face thereof for the insertion of crossed wire ends, bending shoulders in said head adjacent the inner ends of said slots for supporting the ends of the crossed wires when said head is given a slight axial turn, bodily movable slides on said head disposed to bend the ends of the crossed wire over the bending shoulders, and means for rotating the head in one direction to twist the crossed wire ends together and then in the reverse direction to free the bent ends from the bending shoulders.

12. In a pail hooping machine, a twisting head provided with oppositely extending shoulders adapted to support wire ends when the head is given a slight axial turn, means for bending the ends of the wire over the shoulders and means for rotating said head in one direction to twist the bent wire ends together and then in the reverse direction to free the twisting head from the bent wire ends.

13. In a machine of the character described, a twisting head provided with an opening leading in from the face thereof for the entrance of crossed wire ends and shoulders in said head for supporting the wire ends, bending fingers and means for operating the same to bend the wire ends over said supporting shoulders.

14. In a machine of the character de-

scribed, a twisting head provided with an opening leading from the face thereof for the reception of crossed wire ends and shoulders in said head for supporting the wire ends, bending fingers, means for operating the same to bend the wire ends over said supporting shoulders, and means for bodily rotating the twisting head to carry the supporting shoulders into supporting position beneath the crossed wire ends after the same have been entered in the opening provided therefor.

15. In a machine of the character described, a twisting head comprising a pair of relatively slidable members, one of said members being provided with an opening leading in from the face thereof for the entrance of crossed wire ends and a pair of shoulders arranged within the opening for supporting the wire ends, the other of said members having bending fingers thereon, and means for operating said fingers to bend the wire ends over the supporting shoulders.

16. In a machine of the character described, a twisting head comprising a pair of relatively slidable members, one of said members having spaced wire supporting shoulders adapted to receive and support the opposite ends of a crossed wire, means for bodily rotating said member to carry the supporting shoulders beneath the crossed wire ends, the other of said members having bending fingers coactive with the supporting shoulders to bend the wire ends over the said shoulders, and means for operating said fingers.

17. In a pail hooping machine, a tubular shaft member, a rod member slidable therein rotatable therewith, a twisting head carried by one of said members and bending element carried by the other of said members.

18. In a pail hooping machine, a tubular shaft member, a rod member slidable therein but keyed to rotate therewith, a twisting head carried by one of said members and provided with bending shoulders and bending fingers carried by the other of said members and arranged to co-operate with said bending shoulders.

19. In a machine of the character described, a twisting head provided with an entrance leading from its exposed face into the body thereof for the reception of crossed wire ends, wire supporting shoulders extending transversely into the entrance and a cutting edge adjacent one of said shoulders, bending fingers cooperating with said shoulders and one of said fingers having a cutting edge cooperating with the cutting edge on the twisting head, a pail support, means for reciprocating the twisting head toward and away from said pail support and means for rotating the twisting head.

20. In a machine of the character described,

a twisting head provided with an entrance for twisted wire ends leading in from the lower face of said head and with guides at opposite sides of said entrance, wire supporting shoulders within the entrance and terminating at said guides and bending fingers slidably engaged in said guides and cooperating with said shoulders.

21. In a pail hooping machine, a support, provided with means for holding a pail thereon, a wire twisting head adjacent said support, means for securing the end of a wire to the pail on the support, means for rotating the pail support to wrap the wire about the pail and carry the end of the wire beneath the twisting head, and means for operating the twisting end to secure the wire in hoop form.

22. In a pail hooping machine, a support provided with means for holding a pail thereon, a wire twisting head adjacent said support, means for securing the end of a wire to the pail on the support, means for rotating the pail support to wrap the wire about the pail and carry the end of the wire beneath the twisting head, means for operating the twisting end to secure the wire in hoop form, a hammer adjacent the twisting head for setting the ends of the hoop wire into the body of the pail, and the rotating means aforesaid arranged to further rotate the pail support to carry the wire ends beneath said hammer.

23. In a rotary pail hooping machine, a pail support, a dog for securing the end of a wire to a pail on the support, means for rotating the pail support and thereby wrapping a length of wire about the pail on the support, means for securing the ends of said wire in a hoop on the pail and means for tripping the dog from holding engagement with the wire after a predetermined movement of the pail support.

24. In a pail hooping machine, a pail support, a dog for securing the end of a wire to a pail on the support, means for twisting the ends of said wire together into a hoop, means for setting the ends of the wire into the body of the hoop, means for advancing the pail support to carry the wire ends from the twisting means to said setting means and means for operating the twisting head to trip the dog from holding engagement with the wire.

25. In a pail hooping machine, a pail support, a dog for binding the end of a wire against a pail on the support, a wire carrier and means for advancing said wire carrier to carry the wire into the bite of said dog.

26. In a pail hooping machine, a pail support, a dog for securing the end of a wire to a pail on the support, a wire carrier and means for advancing said wire carrier to carry the wire into the bite of said dog and for thereafter retracting said carrier, means

for rotating the pail support to wrap the wire about the pail, means for severing the wrapped length of wire from that on the carrier and means for twisting the ends of the wrapped length of wire together to form a hoop on the pail.

27. In a pail hooping machine, a pail support, a slidably supported wire carriage provided with guide rolls for the wire, means for rotating the pail support, and means for securing the advanced end of the wire to the pail on the support, whereby in the rotation of said support the wire will be drawn over the guide rolls and wrapped about the pail.

28. In a pail hooping machine, a pail support, means for securing the end of a wire to a pail on said support, a wire carriage and means for reciprocating said carriage to carry the advanced end of the wire into engagement with said securing means and to then retract the carriage into position for the succeeding operation and means for rotating the pail support to wrap a length of wire about the pail body to form a hoop thereon.

29. In a pail hooping machine, a pail support, means for rotating said pail support to wrap a hoop wire about the pail on said support, means for securing the ends of said hoop wire and means for holding the pail support in its rotated position while said securing means is operating on the wire.

30. In a pail hooping machine, a pail support, a hammer for securing the ends of a hoop wire on the pail on the support, means for rotating said support to wrap a hoop wire about the pail and to bring the ends of such wire beneath the hammer and means for holding the pail support in such advanced position.

31. In a pail hooping machine, a pail support, means for rotating the same, a wire twisting device, a wire end clinching device and cam mechanisms for intermittently and sequentially operating said devices.

32. In a pail hooping machine, a rotatable pail support, a ring rotatable with the pail on said support and a wire holding dog carried by said ring and adapted to coact with the side of the supported pail to grip the end of a wire thereagainst.

33. In a pail hooping machine, a rotatable pail support, a ring rotatable with the pail on said support, a wire holding dog carried by said ring, and adapted to bind the end of a wire against the side of the supported pail and gearing for intermittently and simultaneously rotating said support and ring.

34. In a pail hooping machine, a rotatable pail support, a ring rotatable with the pail on said support, a wire holding dog car-

ried by said ring and adapted to bind the end of a wire against the side of the supported pail, a gearing for intermittently rotating said support and ring, and means for holding the ring against backward rotation.

35. In a pail hooping machine, a rotatable pail support, cooperating hoop applying devices, operating means for said parts, controlling mechanism for starting said operating means and throw-out mechanism for interrupting action of said operating after performance by said parts of a predetermined cycle of operations.

36. In a rotary pail hooping machine, a pail support having a positioning member engaging the inner wall of a pail mounted on said support and rotary means outside the pail and substantially opposed to said positioning member for pressing the end of a wire against the outer surface of the pail and simultaneously holding the pail against the positioning member.

37. In a pail hooping machine, a rotatable pail support, a pivoted dog having a wire gripping portion disposed in advance of a line intersecting the centers of the support and dog, means for rotating the pail support and thereby wrapping a length of wire about the pail on the support and means for tripping the gripping point of the dog toward the support at a predetermined movement of the pail support.

38. The combination of means to rotate a pail, means to clamp the free end of a wire to said pail whereby by rotating the pail a length of wire is wrapped about the pail to form a hoop against the body of the pail and means for securing the ends of the hoop to the body of the pail.

39. The combination of means to rotate a pail and means to clamp the free end of a wire to said pail whereby by rotating the pail a length of wire is wrapped about the pail to form a hoop against the body of the pail, means for severing the wire, means to prevent the hooped wire from slacking about the pail while severing the same and means for interlocking the ends of the hoop.

40. The combination of means for wrapping wire around a pail to form a hoop therefor, a combined cutting and twisting head for severing the wire and twisting the ends one around the other to form a joint, and means for withdrawing said twisting head from the path of rotation of the pail while the wire is being formed into a hoop.

41. In a machine for forming a wire hoop about a pail, means for clamping a wire against the pail, means for moving forward the end of the wire into the grip of the clamp, means for twisting the ends of the wire together and means for thereafter disengaging the said clamping means.

42. In a machine for forming a wire hoop about a pail, the combination of means for

holding and rotating the pail and other means for clamping wire to the pail during the rotation thereof to wrap a length of wire thereabout, the latter means being rotated at the same speed as the pail rotation and further means for twisting the ends of the wrapped wire together.

43. In a machine for forming a wire hoop about a pail, the combination of means for holding and rotating the pail and other means for clamping wire to the pail during the rotation thereof, the latter means being rotated at the same speed as the pail rotation, means for securing the wire as a hoop on the pail and means to retain the rotating members in a fixed position when the wire ends are being secured.

44. In a machine for wire hooping pails, wire twisting means composed of a sleeve carrying an anvil block, a cutter and a stem free to slide within said sleeve and carrying the wire cutter.

45. In a machine for wire hooping pails, wire twisting means composed of a sleeve carrying an anvil block, a cutter and a stem free to slide within said sleeve and carrying the wire cutter, and means for rotating both sleeve and stem for twisting the wire ends.

46. In a machine for wire hooping pails, the combination of a wire clamp, a slidable wire straightening carriage, means to move said carriage to supply sufficient length of wire extending from said carriage to be engaged by said clamp against the pail and means for rotating the pail to wrap a length of wire thereabout to form a hoop.

47. In a machine for wire hooping pails, a rotary pail support, a series of operating stations arranged about the pail support, means for supplying a length of wire to the surface of the pail, and means for progressively rotating the pail support to successively present the ends of the length of wire to each of the operating stations.

48. The herein disclosed method of hooping a pail which consists in securing one end of a wire to a pail, rotating the pail while holding said wire under tension to thereby wrap the wire under tension about

the pail, severing said wrapped portion from the rest of the wire and twisting the free ends of the wire together.

49. The herein disclosed method of hooping a pail which consists in securing one end of a wire to a pail, rotating the pail while holding said wire under tension to thereby wrap the wire under tension about the pail, severing said wrapped portion from the rest of the wire while maintaining the initial tension of the wire upon the pail, and twisting the free ends of the wire together.

50. The herein disclosed method of hooping a pail which consists in securing one end of a wire to a pail, rotating the pail while holding said wire under tension to thereby wrap the wire under tension about the pail, severing said wrapped portion from the rest of the wire, twisting the free ends of the wire together, bending the end portions of the wire into hooks and driving said hooks into the body of the pail to thereby prevent untwisting.

51. The herein disclosed method of hooping a pail which consists in securing one end of a wire to a pail, rotating the pail while holding said wire under tension to thereby wrap the wire under tension about the pail, severing said wrapped portion from the rest of the wire, bending the ends of said wire into hooks and driving said hooks into the body of the pail.

52. Apparatus of the character described comprising a rotatable pail support, means for twisting the ends of a hoop wire and located at one point in the rotation of said pail support, a hammer for operating on the twisted wire ends, and located at a subsequent point in the continued rotation of the support, means for applying a hoop wire to a pail on the support while said support is in the latter position and means for rotating the pail support to carry the ends of the hoop wire first to the twisting means and then to the hammer aforesaid.

In testimony whereof I affix my signature.

SIMON COOPER.