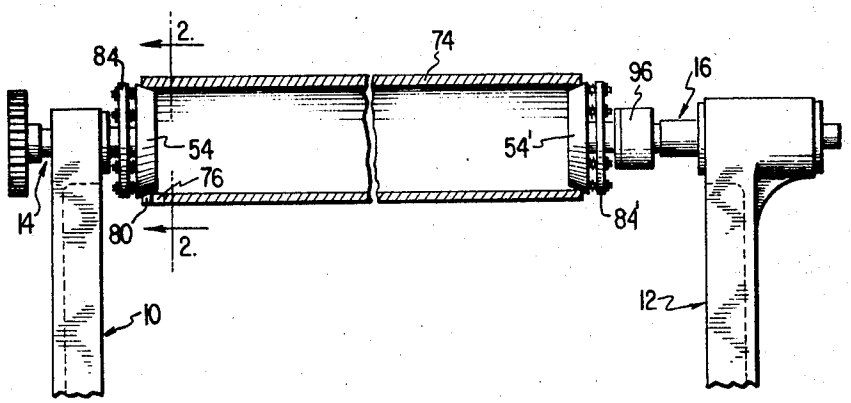
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FLOATING CHUCK ASSEMBLY

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FIG. 1



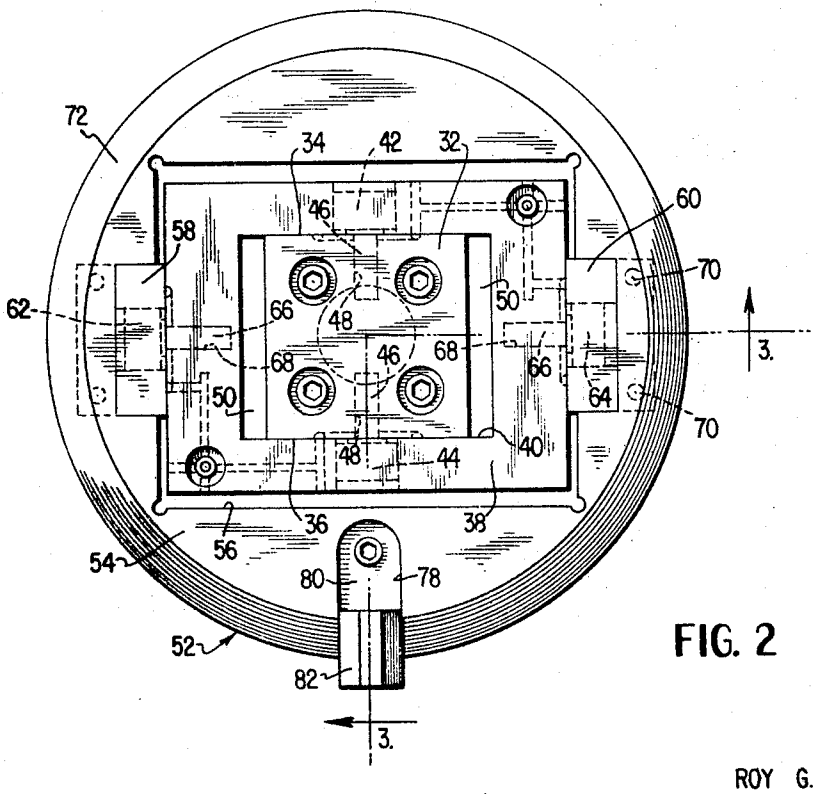


FIG. 2

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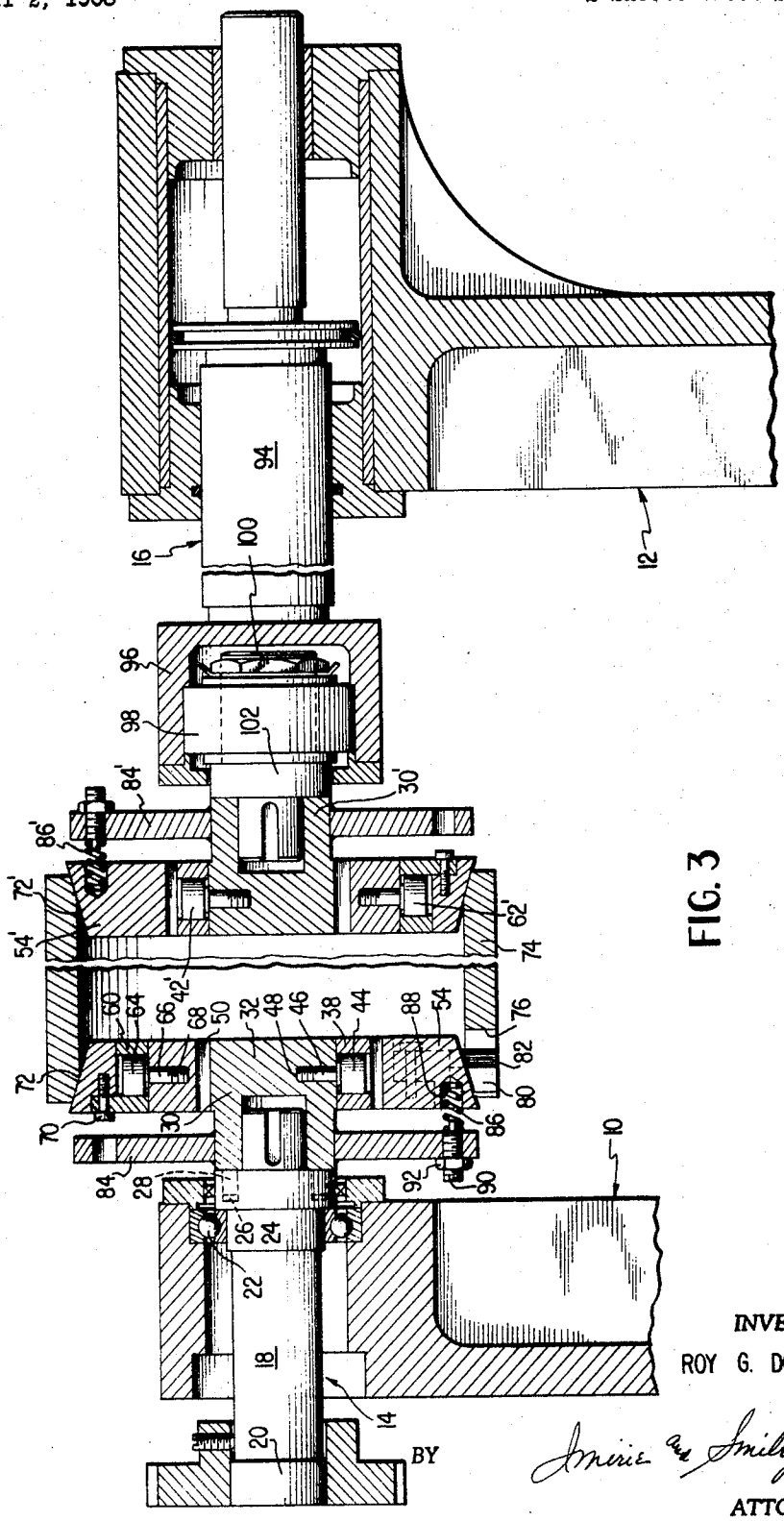


FIG. 3

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United States Patent Office 3,474,982
Patented Oct. 28, 1969

3,474,982

FLOATING CHUCK ASSEMBLY

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Filed Apr. 2, 1968, Ser. No. 718,064
Int. Cl. B65h 17/02
U.S. Cl. 242—68.4 4 Claims

ABSTRACT OF THE DISCLOSURE

An inner block and an outer ring are pivoted about orthogonal axes with respect to a spindle to allow the ring to assume askew relation to a spindle for compensating non-uniformity of the surface of a cylindrical workpiece.

BACKGROUND OF THE INVENTION

During the manufacture of sheet metal strip, the strip or web is wound on a cylindrical steel core and the strip wound on the core is placed in an annealing furnace for heat treatment. During the winding operation, it is important to maintain uniform tension on both edges of the web and to this end, the core must be so supported as to allow its outer surface to run true even through the same may be non-uniform with respect to the inner surface of the core from which the core is supported for rotation. Otherwise, substantial stress is imparted to the supporting mechanism for the core. The cores themselves are of considerable weight, up to more than 1100 pounds, and of course when wound with a full load of web, the total weight is even greater so that the support mechanism must freely allow the winding surface of the core to run true for even tensioning of the web as aforesaid to avoid inordinate stress on the support mechanism while allowing the web to wind evenly on the core.

When the cores are first made, even if rough machined, they can be made to secure substantial uniformity of the outer winding surface with respect to the inner supporting surface but the core, together with webs wound thereon are normally subjected to alternate heating and cooling during annealing of the sheet metal web so that the cores become warped ultimately. It is desirable that the useable life of the cores be extended as long as it is possible and it is also desirable to avoid the need for precision machining the cores, either initially or subsequently. On the other hand, the deformed cores tend to chew up the chucks on which they are mounted during the winding operation.

SUMMARY OF THE INVENTION

According to the present invention the chucks which internally engage the cores for winding purposes are constructed so as to allow the tension in the web to align the core automatically for uniform tensioning and even winding of the web, inordinate strain upon the support mechanism thus being avoided. More specifically, the present invention encompasses an improved floating chuck assembly particularly adapted to accommodate deformed and non-precision cores without material damage to the cores or to the chuck elements. The core engaging chuck elements are floatingly supported by universal connections with coaxial supports so that the chuck elements may assume irregular or non-axial orientation when engaging the opposite ends of a core.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a fragmentary view in elevation of a web winding apparatus;

FIG. 2 is an end view of one of the chuck members as seen from the line 2—2 of FIG. 1, and

FIG. 3 is a longitudinal section taken substantially

along the plane of section line 3—3 in FIG. 2 showing details of construction of a floating chuck according to the present invention.

DETAILED DESCRIPTION OF INVENTION

With reference now more particularly to FIG. 1, the winding apparatus comprises rigid support arm assemblies **10** and **11** the arm **10** rotatably carrying a driven spindle **14** and the arm **12** rotatably carrying an idler spindle **16**. The driven spindle includes a shaft **18** FIG. 3, having an outer end **20** which may be splined for the reception of a drive gear or the like for rotation of the shaft **18**. The shaft **18** is suitably journaled within the arm **10** by means of bearings **22**. The inner end of the shaft **18** is provided with a collar portion **24**, the end face on which is provided with a plurality of recesses **26** for the reception of pins **28** carried by the inner end face of the spindle hub **30**.

The outer end **32** of the spindle hub **30** is rectangular or squared, see FIG. 2, to provide flat, parallel opposite side surfaces **34** and **36**. An inner block **38** is provided with a rectangular central opening **40** freely receiving the squared end **32** of the spindle hub **30** to slidably engage the surfaces **34** and **36**, and a pair of headed pivot pins **42** and **44** pivotally mount the inner ring **38** for rotation about an axis perpendicular to the axis of the shaft **18**. The pins **42** and **44** have reduced diameter shanks **46** received in recesses **48** diametrically disposed in the squared hub portion **32**. The rectangular opening **40** of the inner ring **38** is dimensioned to provide a clearance **50** to allow the inner ring freely to swing to skew positions relative to the axis of the shaft portion **18**.

An outer ring assembly **52** includes a plate-like body **54** provided with a central opening **56**, dimensioned to clear the rectangular outer surface of the inner block **38**, as shown in FIG. 2. Pivot blocks **58** and **60** carry headed pivot pins **62** and **64** having reduced shank portions **66** received in diametrically disposed recesses **68** in the opposite legs of the inner block **38**, whereby the outer ring assembly **52** is pivotal about an axis perpendicular to the pivot axis of the inner block **38**.

The main body **54** is recessed to receive the members **58** and **60** and suitable fasteners **70** are provided for detachably securing the members **58** and **60** to the main body **54**. The peripheral surface **72** of the body **54** is of conical configuration so as to be received within the corresponding end of the metal core **74** upon which a web of sheet metal is to be wound. As shown, the corresponding end of the core **74** is provided with a slot or notch **76** and the body **54** is provided with a recess **78** receiving a driving lug or pin **80** which is fixed within such notch **76**.

Preferably, the outer side of the lug **80** is wedge shaped and has tapered surfaces **82** for ease of engagement of this lug within the notch **76** as will be readiy apparent. The spindle hub **30** is provided with a backing plate or flange **84** and a plurality of springs **86** are carried by this backing plate normally to urge the outer ring body **54** to a plane perpendicular to the axis of the shaft portion **18** but to allow it to assume askew positions relative thereto.

The springs **86** are at least three in number and are equi-distantly spaced circumferentially with respect to the outer ring **52**, one end of each of the springs being received in a suitable recess **88** in the body **54** and the opposite end of the spring bearing against the opposed face of the backing plate **84** and retained in position by suitable locating studs **90** which may also serve as spring tension adjustment means in association with the lock nuts **92**.

The construction of the other chuck member is identical to the foregoing description of the drive chuck insofar as

the core-engaging portion thereof is concerned and prime reference numbers for corresponding parts are utilized in FIG. 3. The idler spindle may include a shaft portion **94** suitably enjournaled in the arm **12** with such shaft portion **94** having a cup end **96** receiving a bearing **98** by means of which the stub shaft portion **100** is carried, the stub shaft **100** having a collar portion **102** corresponding to the collar portion **24** of the shaft **18** previously described and associated with the chuck assembly in the same fashion as such previously mentioned collar portion **24**. The chuck assembly **52'** does not utilize a lug **80** such as that described in conjunction with the drive side.

What is claimed is:

1. A floating chuck assembly comprising, in combination,

a pair of support spindles disposed in axially spaced relation,

an inner block pivotally carried by each spindle about an axis normal to the axis of its associated spindle,

an outer ring pivotally carried by each inner block about an axis othogonally related to the pivot axis of its associated inner block, each ring having a conical periphery for partial reception within an end of a cylindrical workpiece,

resilient means normally urging each ring to lie in a plane normal to the axis of its associated spindle,

and a radially disposed flange fixed on each said spindle,

said resilient means comprising coil springs interposed between each said flange and respective outer ring, said springs being equidistantly spaced about said ring.

2. An assembly according to claim **1** wherein

said rings are provided with means seating and locating the respective ends of said springs,

said flanges having internally threaded bores corresponding to and respectively aligned with said seating means,

and stud members threaded in said bores and having means at one end seating and locating the other ends of said springs.

3. A flotaing chuck assembly comprising, in combination,

a pair of support spindles disposed in axially spaced relation,

an inner block pivotally carried by each spindle about an axis normal to the axis of its associated spindle,

an outer ring pivotally carried by each inner block about an axis of orthogonally related to the pivot axis of its associated inner block, each ring having a conical periphery for partial reception within an end of a cylindrical workpiece,

resilient means normally urging each ring to lie in a plane normal to the axis of its asociated spindle,

and drive means operatively connected with one said spindle,

the outer ring carried by said drive spindle having a drive pin extending radially from its conical periphery for driving engagement with a notch in the cooperating end of a workpiece.

4. An assembly according to claim **3** wherein said drive pin is wedge shaped.

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