May 17, 1955 W. J. MANSON ET AL 2,708,445

WIRE PROCESSING APPARATUS

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FIG. 1

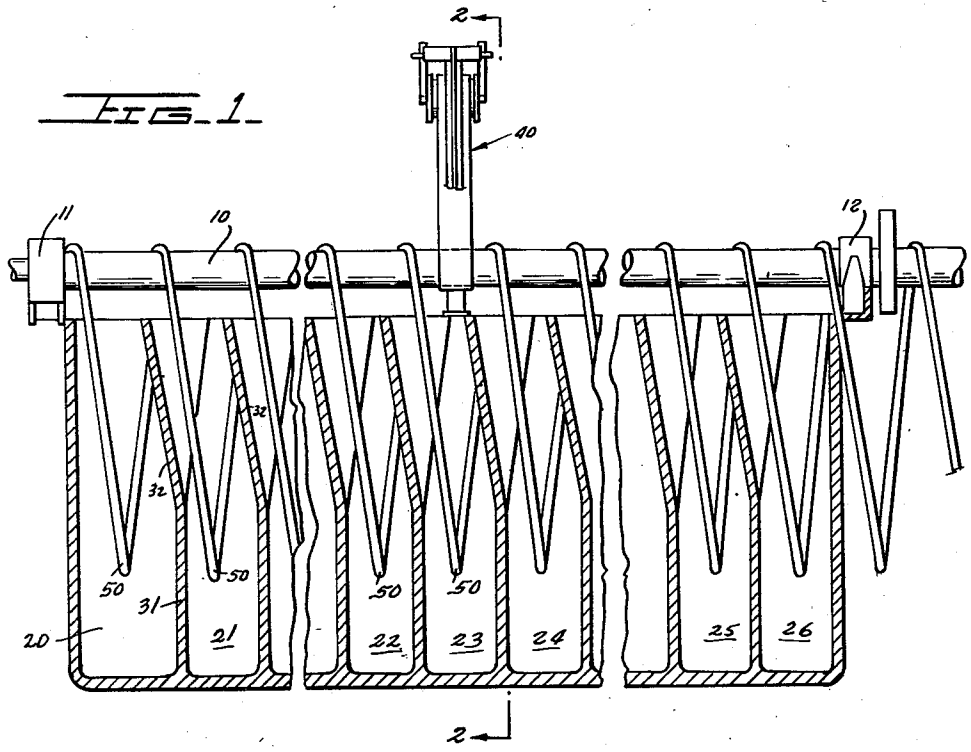


FIG. 2

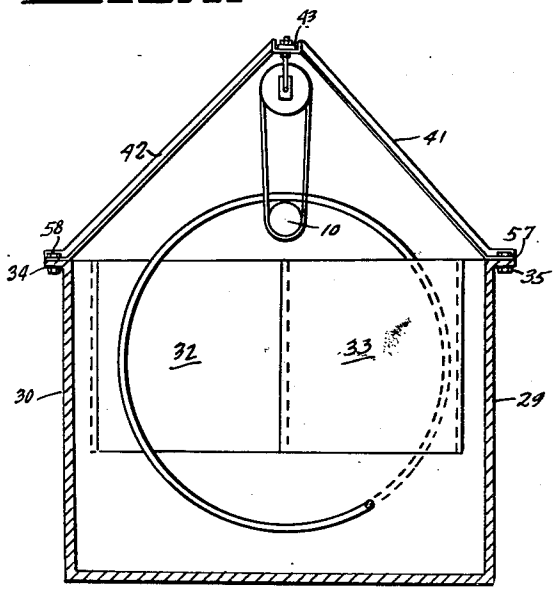
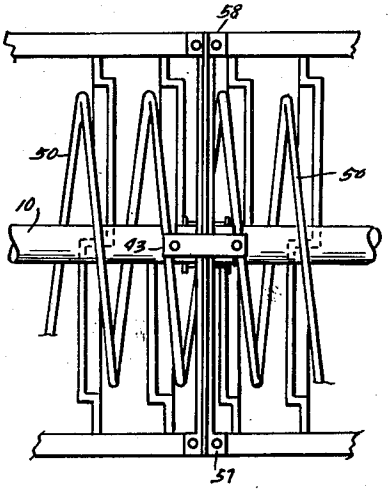


FIG. 3



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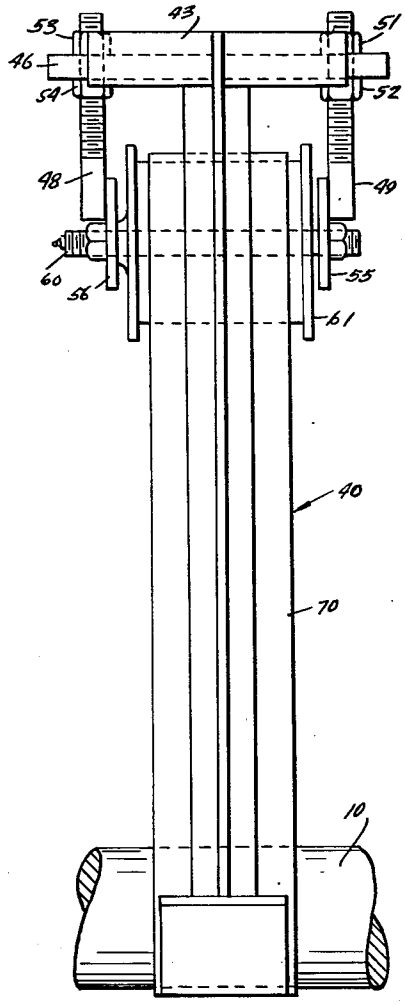


FIG. 4.

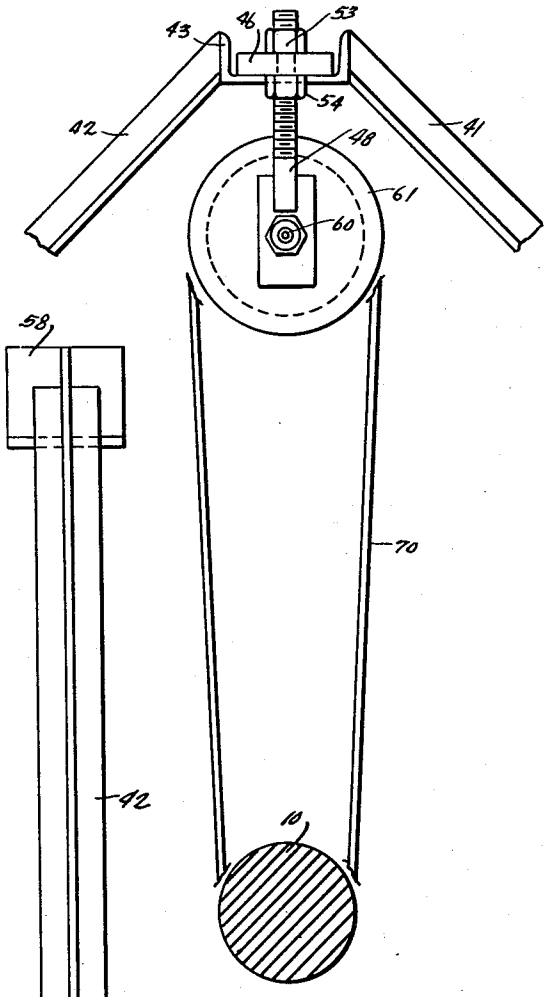


FIG. 5.

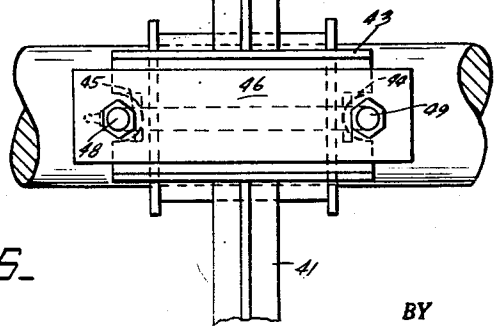


FIG. 6.

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WIRE PROCESSING APPARATUS

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Application July 11, 1952, Serial No. 298,238

2 Claims. (Cl. 134—64)

This invention relates to an improvement in a wire processing apparatus of the type where the wire is continuously treated while being fed on and off of a roller in the form of a helix and is treated while stored on the said roller.

In U. S. Patent No. 2,495,695 an apparatus is described for electroplating wire by temporarily storing the wire in the form of a traveling helix, the separate coils of which are exactly equal in size, on a horizontal roll so that the suspended portions of the coils may be treated. Various similar treating apparatuses for wire are known as, for example, the apparatus of U. S. Patent 1,601,642 (Parker), German Patent 565,764 (Schlatter) but the present invention is particularly applicable to said U. S. Patent No. 2,495,695 because this patent is applied for the plating of very heavy wires and the wires are fed on and off of the storage roller at very high speeds.

It has been found that when the length of the storage roller for such an apparatus is 15 feet or more in length and the roller is supported only at the ends, there is a sag in the roller at the central portion. When plating wire which is ⅛"–⅜" in diameter with the roller holds 100–350 coils each having a circumference of around 8 feet, for example, the weight of the wire held by the roller will be at least 200–250 lbs. Besides this the weight of the roller itself (4 inches more in diameter) is considerable since it is made of steel to obtain the strength required. A roller in such an apparatus had been found to sag as much as 3". When such a roller having a circumference of 24" or less is rotated at a peripheral speed of 60 feet per minute this means that the roller will be bent back and forth at least sixty times per minute assuming the roller always sags. If the sag is too great the roller will not turn at all and eventually the roller will break. The diameter of the roller must be concentric along its entire length in a tolerance of ±.005".

It is impossible to support the central portion of the roller from underneath for several reasons. The liquids from the baths are corrosive and quickly destroy any bearing surface applied to the rollers. Also the supports for a bearing in the center of the apparatus would interfere with the feeding of the wire to the baths which must be juxtapositioned.

Among the objects of the invention is to provide a means for supporting the center portion of a long roller which carries a heavy load from above the said roller.

Among other objects of this invention is to provide an electroplating apparatus of the type described with a support for the center portion of the storage and supporting roll which support does not interfere in any way with the bath structure or the feeding of the wire or strip product being treated.

These objects and others ancillary thereto are obtained by supporting the center portion of the said storage roller by means of a freely rotatable flexible belt suspended from a small roller held above the said storage roller. The support for the belt and its small roller is attached to the side of the treating tank structure. Preferably the height of the roller for holding the belt is adjustable because the suspending belt will stretch under the strain.

The foregoing and other objects of the invention will be best understood from the folowing description of an exemplification of the same when read in connection with the accompanying drawing, in which,

Fig. 1 is a side, cross-sectional view of the apparatus of the invention.

Fig. 2 is a cross sectional view of the apparatus taken on line 2—2 of Fig. 1.

Fig. 3 is a top plan view of the central portion of Fig. 1.

Fig. 4 is a detail side view of supporting structure.

Fig. 5 is a detail end view of the supporting structure.

Fig. 6 is a detail top view of the supporting structure.

The apparatus comprises the helix storing and supporting roll **10** supported at each end of the apparatus by bearings **11** and **12**, the set of juxtapositioned tanks **20—26** situated beneath the roller **10** so as to surround a substantial portion of the suspended coils **50** and the central roll supporting structure **40**.

The exact structure of the tanks for holding the baths is not an essential part of this invention. The tanks shown are actually formed within one large tank having end walls **27** and **28** and side walls **29** and **30**. The partitions **31** between the side walls **29** and **30** are all similar and are made with portions **32** and **33** sloping in opposite directions so as to substantially parallel the path of the rotating wire helix. These sloping portions could be omitted or other expedients such as attaching the partitions at an angle can be employed to prevent frictional contact between the wire and the partitions.

The sides **29** and **30** of the tank body have reinforcing flanges **33, 34** at the top edge. These reinforcing flanges **33** and **34** are shown as being integrally formed on the top edge of the sides but it is obvious that other reinforcing means may be employed. For example, reinforcing angle pieces may be attached to the sides **29** and **30**.

The auxiliary support of the invention is suspended from above the roller **10** by means of the two T-bars **41, 42** which are attached to the flanges **33, 34** of sides **29** and **30**. The T-bars **41, 42** are connected at their upper end by means of the U-shaped member **43**. Suitable means **57** or **58** are provided at the ends of T-bars **41, 42** for attaching these bars to the sides **29** or **30** of the tank structure.

As best shown in Fig. 6, the U-shaped member **43** contains slots **44, 45**, at the ends and carries a heavy bar **46** which holds the adjustable suspending bolts **48, 49**. Suitable adjusting nuts **51, 52, 53, 54** are provided at one end of the suspending bolts **48, 49** and at the other end a plate **55** or **56** adapted to act as a bearing plate for the axle **60** of the supporting roller **61** is located. It can readily be seen that by adjusting nuts **51–54** the roller **61** can be raised or lowered.

The endless belt **70** passes around rollers **61** and **10**. A very satisfactory type of belt is one made from flexible fabric impregnated or coated with acid and alkali resistant resins. This belt can be preformed and slipped over one end of the roller **10** before fixing the said roller **10** in its bearings **11** or **12** or the belt **70** can be applied as a band and sewed or otherwise united at the ends to form the endless belt.

The roller **61** is freely rotatable and therefore the belt **70** will be rotated by roller **10** and in turn will rotate the roller **61**.

In said U. S. Patent 2,495,695 an additional roller of the same length as roller **10** is employed to press against the wire at the top of roller **10**. The supporting device **40** of this application operates the same whether or not a top roller is employed.

Thus it will be seen that this invention provides a novel supporting means which is adjustable, out of the way and yet effective for supporting long rolls carrying heavy loads in electroplating apparatuses. Only one such supporting means **40** is shown but more can be added if desired since the said supporting means are easy to add and do not interfere with any other functioning of the apparatus. Where a roller **10** is much more than 30 feet long two such supporting means would be advisable. Since the belt **70** is corrosion resistant there is no problem of corrosion or excessive friction due to corrosion or failure of lubricants whereas such problems are common where bearing supports are employed close to acid or alkaline baths.

We claim:

1. In a continuous wire processing apparatus comprising a horizontal roller having spaced bearing supports at least 15 feet apart adapted to hold a large number of turns of a continuously advancing horizontal helix of heavy wire, the improvement comprising a series of baths for holding treating liquids positioned below said horizontal helix supporting roller and adapted to surround the suspended portions of the coils of

the wire helix held by said helix supporting roller, a pair of side supports extending upwardly from the sides of said series of baths, means connecting said side supports at an area spaced vertically above said horizontal helix-supporting roller and intermediate the bearings for said helix-supporting roll, a freely rotating roller supported in downwardly extending position from said support connecting means and an endless belt extending around the freely rotating roller and the helix supporting horizontal roller whereby to hold the helix supporting roller against sagging.

2. The device as set forth in claim 1 comprising means for adjusting the distance between the freely rotating roller and the sides of said series of baths.

References Cited in the file of this patent

UNITED STATES PATENTS

737,162	Shelton	Aug. 25, 1903
2,495,695	Camin et al.	Jan. 31, 1950

FOREIGN PATENTS

479,882	Germany	July 25, 1929