Nov. 23, 1943. E. F. HUDDLE 2,334,930

APPARATUS FOR USE IN THE APPLICATION OF COATING MATERIAL OR THE LIKE TO ARTICLES

Filed July 30, 1941

Fig. 1.

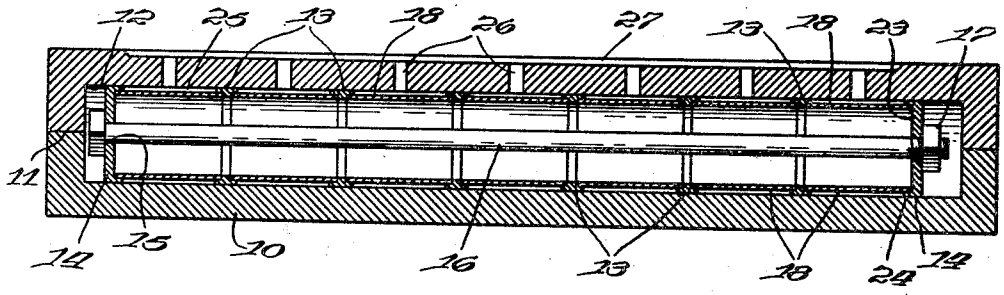


Fig. 3.

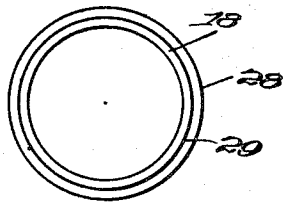


Fig. 2.

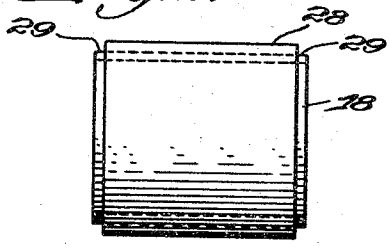


Fig. 5.

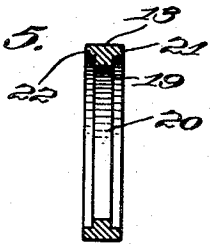


Fig. 4.

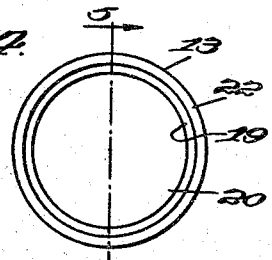


Fig. 6.

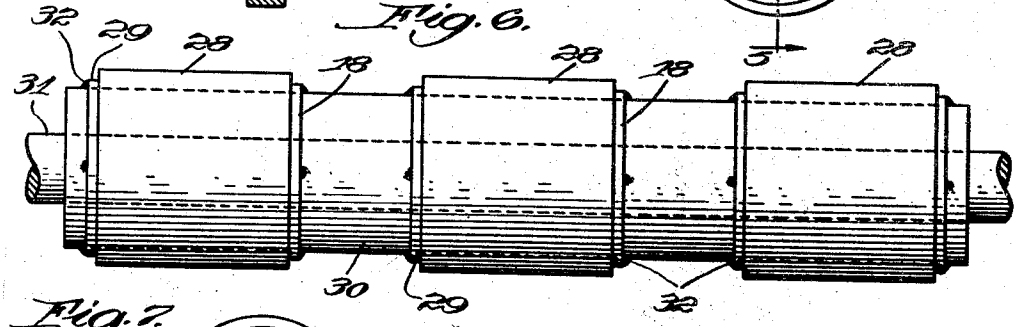
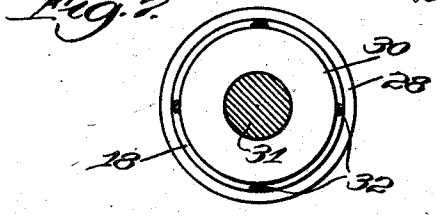


Fig. 7.



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APPARATUS FOR USE IN THE APPLICATION OF COATING MATERIAL OR THE LIKE TO ARTICLES

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Application July 30, 1941, Serial No. 404,638

7 Claims. (Cl. 18—34)

This invention relates to an apparatus for use in the manufacture of a plurality of similar or identical articles and particularly to a phase of manufacture or production which involves the application of a coating material or the like to such articles.

For the purpose of clarifying the following description, resort will be had to the description of the apparatus in conjunction with the manufacture of a particular type of article or articles. It will be understood, of course, that reference to one particular adaptation of the invention does not preclude the utilization of the principles of the invention in other instances.

With the foregoing in mind, reference is had to the use of the invention in the manufacture of rollers known as draper rollers. Such rollers are commonly used, for example, in harvesting machinery, wherein there is provided a conveyer or canvas apron consisting of a pair of spaced draper rollers about which is trained an endless belt comprising the conveyer or apron. It has been found that certain constructional details are permissible in the design and use of rollers of the type referred to, and that the elimination of certain parts of such roller can be indulged in without affecting the use of the roller. In an instance of the type referred to, wherein the rollers are used in conjunction with a canvas apron, it has been found that the use of a coating material such as rubber or the like on the roller provides a suitable friction material by which the roller may engage the canvas in driving relation. It has been found, however, that it is not necessary that the entire roller be covered with this material. To this end the canvas apron, which is of considerable width, is provided at its inner surface with a plurality of endless belts of leather or similar material, rigidly secured to the apron and spaced axially or crosswise thereof as respects the rollers. In such a construction it is necessary that the rollers be provided with friction material only at those portions thereof that are coincident with the positions of the leather or rubberized belts on the apron.

The use of a roller of the type discussed generally above created certain manufacturing problems, among which was the problem of providing an efficient and inexpensive method and apparatus for constructing the roller. The present invention is directed to an apparatus for use in the manufacture of rollers or parts thereof which may be simply and inexpensively produced in lots of large numbers and particularly to apparatus for coating with rubber or the like material, cylindrical tubular portions adapted to be disposed on the roller for the purpose of serving as driving members for the leather belts of the endless canvas apron.

The principal object of the present invention is to provide an apparatus for use in the application of coating material or the like to a plurality of roller sections. In its broader aspect the invention embraces within this object the provision of such apparatus for use in the coating of the surface of any form of article which can be coated according to the principles and concepts of the invention hereinafter disclosed.

An important object of the invention is to provide an apparatus in which a plurality of similar articles may be coated substantially simultaneously.

Another important object is to make provision in such apparatus of means for defining certain characteristics of the material to be applied to the surfaces of the article, and particularly those characteristics such as the size, shape, or the like.

Another object of the invention is to provide in the apparatus means adapted to prevent the coating of certain portions of the articles, for the purpose, for example, of leaving bare or uncovered portions which may be fitted, attached, or otherwise associated with certain other elements of a machine or structure in which the article or articles may be used.

A complete understanding of the foregoing objects and numerous other objects and features of the invention will become apparent to those versed in the art as the description of a preferred embodiment of the invention is more fully made. In this respect reference is had to the following detailed description and accompanying sheet of drawings, in which:

Figure 1 is a sectional view of an apparatus constructed according to the present invention;

Figure 2 is an elevational view of one form of the article as produced in the apparatus of Figure 1;

Figure 3 is an end view of the article shown in Figure 2;

Figure 4 is an end view of one of the parts of the apparatus shown in Figure 1;

Figure 5 is a sectional view of the part shown in Figure 4, the view being taken on the line 5—5 of Figure 4;

Figure 6 is a view of the completed roller showing the installation therein of an article of the type similar to that in Figure 2; and,

Figure 7 is an end view of the roller shown in Figure 6.

As shown in Figure 1, a preferred embodiment of the invention includes the provision of an apparatus particularly adapted for use in the application of molded rubber to the outer surface of a plurality of cylindrical tubular roller sections. The following description will pertain to the use of the apparatus and the treatment of cylindrical tubular articles, but it is to be understood that the terms having reference to the characteristics of such articles are only relative and that the description likewise pertains to the treatment of any other form of articles which may be the object of treatment in other and related apparatus.

Figure 1 illustrates an apparatus comprising a mold or jig structure designated generally by the reference character 10. The mold is preferably composed of two symmetrical halves, the mold being divided on a parting line, as at 11, running longitudinally thereof. The interior of the mold is hollow and provides an inner cylindrical surface 12. It will be understood, of course, that each half of the mold is provided with a semi-cylindrical surface, these surfaces combining to form the cylindrical surface when the halves of the mold are assembled. The mold is provided with means for supporting the articles therein. This means preferably consists of a plurality of spacer elements or rings 13 adapted to be arranged in axially spaced relation within the cylindrical surface 12. The structure further includes a pair of end members 14, each of which is apertured, as at 15, to receive therethrough a headed bolt 16 onto one end of which is threaded a nut 17. The bolt, of course, passes through the rings or spacers 13.

Each of the articles to be coated comprises, as here illustrated, a tubular cylindrical sheet metal member or section 18 having an outer cylindrical surface. A plurality of identical fixtures or articles are arranged within the mold or jig, as shown in Figure 1. As best shown in Figure 5, each of the spacer elements or rings 13 is provided with a peripheral or annular outer portion generally T-shaped in cross-section. The inner leg of the T, as at 19, forms part of a radial wall portion open at its center as at 20. The cross-portions of the T extend at opposite sides of the median plane of the ring 13 and form parts of opposite axially extending annular portions 21 and 22. The inner surfaces of the annular portions 21 and 22 have a diameter equal to the outside diameter of the sheet metal section 18. As shown in Figure 1, the sections when assembled in the jig and mold have their end portions fitting the inner surfaces of the annular portions 21 or 22 of the rings or spacers 13. The radial wall formed by the leg portion 19 of the T is abutted by the proximate ends of adjacent sections 18. Since the annular portions 21 or 22 of the rings 13 surround the end portions of the respective sections 18, it will be seen that certain portions of the surface of the sections are covered or surrounded. As shown in the drawing, the radial faces of the annular portions 21 and 22 are uniform, but it will be understood that these faces may have any desired shape or configuration to conform to a particular shape or configuration required in the coating on the sections. In the particular embodiment of the invention illustrated, there is no necessity for other than a straight side or edge on the material to be supplied to the sections 18, as will hereinafter more fully appear.

Each of the end members 14 has a radial wall portion 23 which abuts an end of a proximate section 18. The member includes also an annular wall or flange 24 which overlaps or covers a portion of the outer surface of the section 18. The manner in which the annular portion 24 of the member 14 covers a portion of the surface of the section 18 is similar to the manner in which other section ends are covered by the annular portions 21 and 22 of the spacer elements 13. When the end members, spacer rings, and sections are assembled in the mold or jig 10, the end members and spacer members have their outer surfaces exactly fitting the inner cylindrical surface 12 at the interior of the mold or jig. The bolt 16 is drawn up tightly and the end members, sections, and spacer rings are securely held together as a unit which may be readily handled. This unit is placed in the lower half of the mold 10 and the upper half of the mold is then installed and held in place by any suitable means. As previously stated the rings 13 and end members 14 exactly fit the cylinder surface 12 of the mold 10. The rings 13 thus provide means for dividing or separating the mold 10 into a plurality of axially spaced, annular pockets or chambers 25 respectively open to the outer surfaces of the sections 18. The end members 14 complete the chambers or pockets for the end sections. The difference between the inside diameter of the cylindrical surface 12 and the outside section determines the thickness characteristic of the coating material to be applied. As shown in the present drawing, the diameter of the section 18 is uniformly less than the diameter of the cylindrical surface 12. It will be understood, of course, that the thickness need not be uniform and that the pockets 25 may be interrupted by portions of the mold, or portions of the section or articles to be coated, or may be otherwise disposed to conform to any desired shape or configuration. In the present instance, the type of section desired is one for a cylindrical coating or material in the form desired.

The upper half of the mold is provided with a plurality of openings or gates 26, each of which communicates at its inner end with one of the pockets 25, the outer ends of the gates communicating with a common supply passage 27. The gates and the passage 27 provide means for supplying coating material to the chamber or pockets 25. In the apparatus illustrated in Figure 1, the pockets 25 are separated by the rings 13, and therefore it is preferable that the mold include individual gates.

A roller section of the type produced by the use of the apparatus shown in Figure 1 is illustrated in Figure 2, whereat it is shown that the tubular section 18 has an outer coating 28 which is preferably of molded rubber or like material. As shown in this figure, the coating 28 does not cover the entire section 18. Opposite end portions of the section are bare or exposed as at 29. The portion 29 of the section is that section which was surrounded or covered in the mold by the peripheral portions of the rings 13. Of course, a similar exposed portion may be formed on a similar section by the relation of such section and a hand member 14.

Figure 6 illustrates the installation of a plurality of sections in a roller of the type referred to above, wherein there is shown a main roller body 30 mounted on a shaft 31. This shaft is adapted to be mounted in suitable bearings in the machine in which it is to be utilized. The coated sections 18 are fitted on the roller body 30 in axially spaced relation. The exposed portions 29 provide suitable portions which may be

utilized in the securing of the section to the roller. In the present illustration it is shown that the exposed portions are adapted for the use of welding material as at 32 as the means for securing the sections to the rollers. As shown in the drawing, the sections are secured at only circumferentially spaced points to the roller body 30. It has been found that this form of securing means serves the purposes intended and at the same time provides means which may be readily cut so that the sections may be removed from the roller when replacement thereof is necessary. The preferred practice involves the making of saw cuts in each of the welds 32 after which light blows will suffice to loosen the sections from the roller body. It will be understood of course that a continuous weld may be utilized in place of the tack weld 32.

From the foregoing description it will be seen that a simple and economical apparatus has been provided for the manufacture of roller sections in large quantities and that the apparatus includes desirable means for exposing only portions of the surface of the rollers to be treated with coating material, thereby at the same time providing that certain portions of the surface of each section will remain uncoated.

It will be understood, of course, that a material other than rubber or rubber in its molded form may be applied to the sections 18 or that material may be similarly applied to other articles which may or may not differ widely from the particular sections or articles illustrated. Such utilization of the apparatus and alterations in the construction thereof are believed to be within the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. Apparatus for use in the application of coating material or the like to the surfaces of a plurality of tubular sections, comprising a jig in which the sections are placed in edge-to-edge, coaxial relation, with proximate edges of adjacent sections spaced apart, said jig including a plurality of members, each adapted to surround the proximate end portions of adjacent sections and the space therebetween, each member being adapted to surround and cover a portion of the surface of a section adjacent the proximate edge of said section to leave exposed to the application of coating only a portion of the surface of said section, each member further including means extending radially inwardly therefrom and adapted to extend into the space between and to engage proximate edges of adjacent sections to space said sections apart, and said jig including securing means adapted to engage the end sections to secure the sections and rings together.

2. Apparatus for use in the application of coating material or the like to the surfaces of a plurality of tubular sections, comprising a jig in which the sections are placed in coaxial, end-to-end relation with proximate ends of adjacent sections spaced apart, said jig including means maintaining the spaced relation of the sections and including a plurality of elements disposed respectively at the junctions between the sections, said elements being respectively adapted to surround and cover portions of the surfaces of sections at the ends of said sections, said jig including means at opposite ends of the jig respectively including elements adapted to surround and cover portions of the surfaces of the end sections, the elements of said means being thereby adapted to expose only desired portions of the section surfaces to the application of coating material, and means including a casing adapted to surround the jig and sections and having a plurality of inner portions respectively between adjacent of the first-named elements and respectively adapted to cooperate therewith and with the exposed surfaces of the sections to define characteristics of coating material to be applied to said surfaces.

3. Apparatus for use in the application of coating material or the like to the outer surfaces of a plurality of similar cylindrical articles, comprising means forming a casing with a hollow interior of a size adapted to contain a plurality of articles when placed therein in end-to-end, coaxial relation, a plurality of circular article-supporting elements spaced axially apart within the cylinder at distances substantially equal to the length of an article, each element having an inside diameter equal to the diameter of an article, each element being adapted to have fitted therein an end portion of each of two adjacent articles for the support of said articles, portions of the surface of the interior of the casing being disposed in radially spaced relation relative to the inside diameter of the supporting elements and thereby forming with adjacent elements, articles, and the interior of the casing a plurality of axially spaced pockets open respectively to the surfaces of the articles except at those portions of the articles which fit said elements, and means in the casing for supplying coating material to said pockets.

4. Apparatus for use in the application of coating material or the like to the outer surfaces of a plurality of cylindrical tubular articles, comprising a jig adapted to hold the articles alined in coaxial, end-to-end relation with adjacent ends of said articles spaced slightly apart, said jig including a plurality of rings adapted to be disposed respectively at the junctions of the articles, each ring having an outer annular portion T-shaped in cross-section, the leg portion of the T extending radially inwardly and being adapted for disposition between and engaging the proximate ends of adjacent articles and the oppositely extending cross portions of the T being adapted respectively to fit and cover outer, proximate surface portions of adjacent articles to leave exposed only portions of the surface of each article, and said jig including means adapted to pass axially through the articles and rings for holding the articles and rings assembled in the jig.

5. Apparatus for use in the application of coating material or the like to the outer surfaces of a plurality of cylindrical tubular articles, comprising a jig adapted to hold the articles alined in coaxial, end-to-end relation with adjacent ends of said articles spaced slightly apart, said jig including a plurality of rings adapted to be disposed respectively at the junctions of the articles, each ring having an outer annular portion T-shaped in cross-section, the leg portion of the T extending radially inwardly and being adapted for disposition between and engaging the proximate ends of adjacent articles and the oppositely extending cross portions of the T being adapted respectively to fit and cover outer, proximate surface portions of adjacent articles, said jig including cap members adapted to be disposed respectively at opposite ends of the alined articles, each cap having a radial portion adapted to abut the outer end of an article and an annular portion adapted to fit and cover the proximate outer surface of said article, said cap members and

rings constituting means adapted to expose to the application of coating material only portions of the article surfaces, and said jig including means adapted to engage the cap members and to pass through the rings and articles for holding the articles and rings assembled therebetween.

6. Apparatus for use in the application of molded rubber coating to the outer surfaces of a plurality of cylindrical tubular roller sections, comprising a mold having a hollow interior with a cylindrical surface of a diameter greater, by the thickness of a desired coating, than the diameter of the sections to be coated and of a length accommodating the combined length of the sections when placed therein in coaxial, end-to-end relation, means in the mold adapted to support the sections with their outer surfaces spaced annularly radially inwardly of the cylindrical interior surface of the mold, the outer cylindrical surfaces of the sections and the cylindrical interior surface of the mold thereby forming an annular chamber, means adapted to separate said chamber into a plurality of pockets respectively open to the surfaces of the sections, and means for flowing rubber into the mold and to said pockets.

7. Apparatus for use in the application of molded rubber coating to the outer surfaces of a plurality of cylindrical tubular roller sections, comprising a mold having a hollow interior with a cylindrical surface of a diameter greater, by the thickness of a desired coating, than the diameter of the sections to be coated and of a length accommodating the combined length of the sections when placed therein in coaxial, end-to-end relation, means in the mold adapted to support the sections with their outer surfaces spaced annularly radially inwardly of the cylindrical interior surface of the mold, the outer cylindrical surfaces of the sections and the cylindrical interior surface of the mold thereby forming an annular chamber, annular partition means carried in the interior of the mold adapted to be arranged respectively at and surrounding the junctions of the sections to support said sections and to separate said chamber into a plurality of annular pockets respectively open to the surfaces of the sections, and means for flowing rubber into the mold and to said pockets.

EDWIN F. HUDDLE.