Jan. 19, 1943. S. DECKER 2,308,538

METHOD OF AND APPARATUS FOR MANUFACTURING CONFECTION STICKS

Filed Jan. 26, 1940

Fig. 1

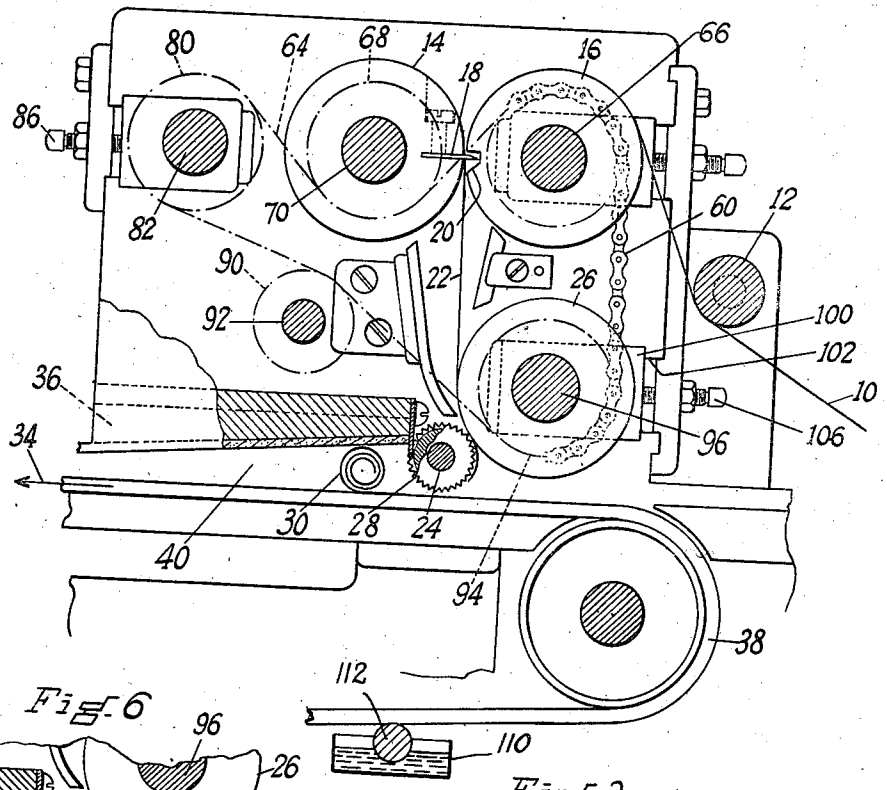


Fig. 6

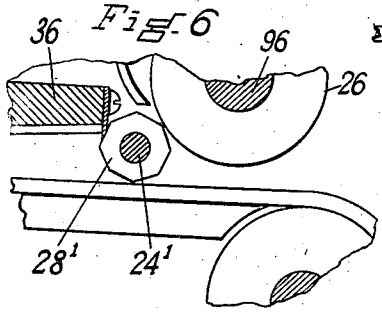


Fig. 3

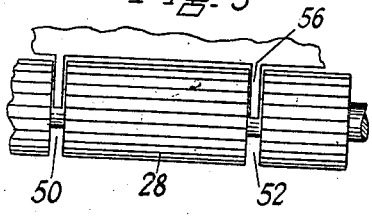


Fig. 4

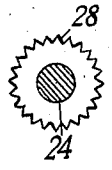
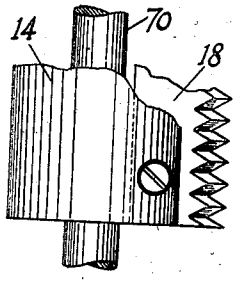


Fig. 2



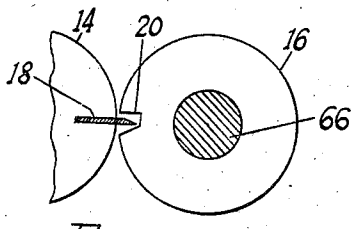


Fig. 5

INVENTOR.

BY Sol Decker

N. T. Holbrook

ATTORNEY.

Patented Jan. 19, 1943 2,308,538

UNITED STATES PATENT OFFICE

2,308,538

METHOD OF AND APPARATUS FOR MANUFACTURING CONFECTION STICKS

Sol Decker, Chicago, Ill., assignor to Setter Bros. Inc., Cattaraugus, N. Y., a corporation of New York

Application January 26, 1940, Serial No. 315,770

8 Claims. (Cl. 93—1)

This invention relates to paper machinery and is more particularly concerned with apparatus for automatically forming tightly wound paper bodies in the nature of rods or sticks. One advantageous and important use for such sticks is in the lollypop industry.

The illustrative apparatus unwinds a master strip of paper from a supply roll, leads the strip to a crimping unit which acts to form a crease or creases transversely of this strip for the purpose of initiating the convolution of uniform sections of the strip. Such sections are formed by continuously operating severing means.

After the sections leave the crimping unit they are subjected to the action of a continuously moving member which frictionally engages one side of the crimped portion, while the opposite side of the circular or parti-circular crimped portion is frictionally engaged by a stationary member or a member advancing at a speed less than the first mentioned member.

The combined action of the section engaging members first rolls each section up into a loosely convoluted paper roll, and then the loosely wound rolls are caused to advance between the members and are subjected to such further action thereby that the rolls are successfully compacted and the sucessive convolutions of the rolls are integrally joined or bonded in such a way that the rolls discharged from the apparatus are solid self-sustaining paper sticks of non-tubular character and of adequate rigidity.

The illustrative paper sticks when used as parts of lollypops or other confections customarily used to a considerable extent by small children have the important advantage that they present no sharp edges liable to injure the children. Their use also involves the elimination of the splintering tendency which applies to wood sticks which have been used to a considerable extent in the prior art. The danger resulting from the use of sharp pointed wooden sticks in this art and the danger resulting from the splintering of such sticks have resulted in such serious accidents to children that in some localities lollypops or other confections having wooden sticks are forbidden by law.

It has been proposed to eliminate the wooden stick by substituting therefor loops of rough cellulosic material but this proposal has not met with success because of manufacturing difficulties and commercial deficiencies of the proposed product. It is an object of this invention to produce tightly rolled paper sticks which will eliminate the above indicated dangers and overcome the difficulties of the proposed product.

The invention contemplates a confection product which has an appearance similar to the product with which children have been long acquainted but is structurally so different from the prior art that low cost manufacture is promoted and physical danger to the child simultaneously minimized.

The illustrative process of stick manufacture is such that tightly rolled paper sticks may be rapidly and automatically formed by apparatus which is reliable in its operation and novel in its components. The stick produced is preferably substantially solid in order that it may properly coact with the manufacture and use of its associated confection.

Other objects of the invention will appear in the following specification in which illustrative embodiments of the invention are described in accordance with the Federal statutes pertaining to such matters, and particularly section 4888 R. S.

The invention is described with reference to the accompanying drawing in which:

Fig. 1 is a diagrammatic or schematic view in the nature of a vertical section of illustrative paper apparatus. This view indicates particularly the location of the crimping unit, and the zone in which the loosely convoluted paper rolls are initially formed.

Fig. 2 is a detail view in the nature of a broken away plan showing the paper severing means employed in the illustrative apparatus.

Fig. 3 is a view in the nature of an elevation showing the relationship of fingers which are received in grooves in the crimping roll for preventing undesired movement of the paper out of the convoluting zone. Figure 4 is a transverse section of the crimping roll.

Fig. 5 is a fragmentary view of a vertical section illustrating the relationship of parts of the paper severing means.

Fig. 6 is a diagrammatic or schematic view in the nature of a vertical section of a modified form of crimping device.

In Fig. 1 of the drawing a master paper strip is fed from a paper supply roll (not shown) under a guide roll 12 to the paper severing means. This means consists of two rolls 14 and 16 operating at the same speed. The roll 14 carries a cutting blade 18 which is indicated in Fig. 1 as extending radially of the roll. This cutting blade is received in a recess 20 of the associated roll 16, and the recess is preferably of the character shown in

order that the cutting blade may properly and quickly sever the master strip into stick strips of uniform length.

The severed stick strip **22** is led from the severing zone by the combined pulling or tension action of the crimping unit **24** and the associated roller **26**. Suitable strip guiding means may be interposed between the severing zone and the crimping unit to prevent the stick strips from undesirably folding up or other action which might interfere with the continuous and high speed operation of the apparatus.

The drawing shows the crimping unit **24** constructed in the form of a roller with peripheral projections or serrations **28**. The surface of the coacting roller **26** is formed of such resilient material and this roller is so pressed against the crimper roller **24** that it will maintain a continuous grip upon the stick strips. The serrations of the roller, of course, extend transversely of the stick strips and operate to crimp the strips so that as they leave the crimping unit they will inherently tend to initiate the formation of such a loosely wound convoluted roll as is indicated generally at **30**.

Preferably the peripheral speed of the endless conveyor **38** in the direction of the arrow **34** is such that it facilitates the formation of the loosely wound roll **30**, and if an endless belt is used in place of the upper convoluting member **36** the speed of this endless belt will be less than the speed of the lower endless belt. As the apparatus is shown in Fig. 1, the fixed convoluting member **36** is so related to the upper surface of the endless belt **38** that a tapered roll compacting passage **40** is provided. This passage, as shown, is of gradually decreasing size toward its stick discharge end.

As the loosely convoluted roll moves along the passage **40** its outside convolutions are so acted upon that the roll is gradually decreased in diameter until a substantially solid non-tubular paper stick is formed. The action of the apparatus upon the convoluted sticks in the passage **40** is also such that the successive paper convolutions will be integrally united and bonded in such a way that sticks leaving the passage **40** are self-sustaining and relatively permanent sticks of adequate rigidity.

In some instances the apparatus so acts upon the paper that the fibers of successive convolutions are interfelted to form a unitary body. This action results in a permanent cohesion of the successive convolutions and this result may be promoted by the use of an automatically operating paper moistening device affecting the surfaces of the convolutions before the loosely wound rolls **30** are formed. In some embodiments of the invention it is also contemplated that a fluid adhesive may be applied to the surfaces of the stick strips which form the inner surfaces of the convolutions.

As indicated in Figs. 1 and 3 of the drawing the crimping unit is provided at intervals along its length with circumferential grooves indicated in Fig. 3 at **50** and **52**. At the forward end of the convolution zone **36** fingers **56** are fixed in such a position that they extend into the grooves **50** and **52**. As many of these fingers are provided as are necessary to prevent any movement of the paper which will interfere in any way with the formation of the loosely wound roll **30**. Enough fingers are provided to insure a uniform and positive initiation of the curling of the paper strips, as they leave the crimper roll. In other words, a sufficient number of fingers **56** is provided to cause all portions of the leading edge of the crimped paper to be simultaneously deflected from the crimping roller **24**.

Further details of the illustrative apparatus include a roller chain **60** connecting the rolls **16** and **26** so that they will operate at the same R. P. M. Movement of the rolls **14** and **16** in unison may be effected by roller chain **64** extending over a sprocket on the shaft **66** of the roll **16** and the sprocket **68** on the shaft **70** of the roll **26**. As shown, this roller chain **64** extends around a sprocket **80** on a shaft **82** mounted in bearings which are movable by means of the tension device **85**. The chain **64** extends from the sprocket **80** over a sprocket **90** mounted on a shaft **92** to the sprocket **94** on the shaft **96** of the roll **26**.

Proper tension upon the stick strips after they leave the severing zone, and the desired action of the crimping unit may be maintained by mounting the shaft **96** in journal bearings **100** slidable in guideway **102** and movable therein by the adjusting mechanism **106**.

The product of the method and apparatus disclosed herein is claimed in my co-pending application No. 310,382, filed December 21, 1939.

Whereas the invention has been described with reference to certain specific embodiments thereof, in compliance with the Federal patent statutes, and particularly section 4888 R. S., it is to be appreciated that the invention is not to be considered as limited to all of the details of these embodiments. The invention is also to be considered of such a scope that it covers considerable modification of the detail of the embodiment, within the scope of the subjoined claims.

I claim:

1. In paper machinery, means feeding a master paper strip from a paper supply roll, means for continuously crimping the strip, means for simultaneously severing the master strip into confection stick strips of uniform length each successively moving through a zone in which they are acted upon by the crimping means, said crimping means initiating the formation of loosely wound confection stick rolls, moisture applying means and convoluting means for continuing the action initiated by the crimping means and acting upon the stick strips in succession to form loosely wound rolls having successive paper convolutions with aligned edges, the convoluting means including elements cooperating to form a tapered passage in which the action of said means compacts the loosely wound rolls as they successively move away from the crimping zone, said means acting to successively decrease the diameter of the loosely wound rolls and bond the successive convolutions until a tightly wound and substantially non-tubular stick results.

2. Apparatus for forming tightly rolled non-tubular paper sticks for confections, the apparatus comprising, in combination, means for severing a long paper strip into sections of predetermined length, means including a polygonal roller for creasing or crimping the leading portion of successive severed sections, means engaging the crimped portion and convoluting the strip into a loosely wound roll by continuing the bending initiated by the crimping operation, and means including a moisture applying device acting upon the loosely wound roll to compact it and bond its successive convolutions into a solid and integral body.

3. In a method of manufacturing a tightly rolled paper stick for confection products, form-

ing paper strips of a length to produce a stick of the desired diameter, crimping the leading portion of each strip and then its successive portions to facilitate subsequent convolution thereof and inherently advancing simultaneously each successive strip to the successive zone of action, loosely convoluting each strip to form a roll as it is passed through the crimping zone and simultaneously arcuately guiding its leading portion immediately after it leaves the zone of crimping, releasing the roll from the convoluting zone, and simultaneously reducing the diameter of the roll and compacting it to a solid stick as it rapidly passes from the convoluting zone to an accumulation zone.

4. The method of forming tightly rolled paper sticks for supporting confections, comprising feeding a strip of paper continuously from a roll, cutting the strip, crimping the leading edge of each section of the strip so formed said crimping involving an inter-gearing grip upon successive strips to facilitate the advance of the strips to the succeeding zone of action, convoluting the crimped strip into a loose roll, compacting the loosely convoluted roll and simultaneously bonding the successive convolutions into a solid self-sustaining stick by subjecting the roll to increasing pressure and a rolling-up action in one direction.

5. A method of forming tightly rolled paper sticks adapted for confection supports, creasing strips of paper along closely spaced parallel lines and from the same side of each strip to cause each strip to curl up as it leaves the creasing zone said creasing involving an intergeared grip on the strips to the end that the crimping inherently involves a positive advance of the strips to the succeeding zone of action, convoluting the curled up strips into loosely wound sleeves, and subsequently compacting the sleeves by further convolution and by the application of pressure to form the sleeves into substantially solid tightly rolled paper sticks.

6. Apparatus for forming tightly rolled paper sticks adapted for confection supports comprising, in combination, means for cutting paper into stick strips, means including a rotating element having well defined edges parallel to the axis of rotation for continuously crimping the stick strips from the same side to cause them to curl up, a member having a resilient surface material into which said rotating element presses the stick strips to crimp them, and means for forming the curled up strips into loosely wound rolls and for compacting said rolls into substantially solid paper sticks.

7. In a machine for the manufacture of small diameter rod-like candy sticks by rolling up paper strips, a crimper, means co-acting with said crimper to cause paper strips to be formed around said crimper to give the strips a tendency to curl up when released therefrom, means acting upon the leading parts of the strips on said crimper for removing them from the crimper and allowing them to assume curled up condition, means for acting upon the curled up strips to convolute them into compact substantially solid and permanently set rod-like sticks.

8. In a method of forming candy sticks, simultaneously pressing paper strips into curvilinear form and crimping or sharply indenting them along parallel lines to cause them to have a convoluting tendency when released from said pressing action, releasing the strips from the pressing and indenting zone, and then rolling up the crimped strips until substantially solid rod-like bodies are formed.

SOL DECKER.