Dec. 25, 1956 H. M. COOK 2,775,377

MACHINES FOR PRODUCING BOWS AND POMPONS FROM RIBBONS

Filed Oct. 4, 1954 2 Sheets-Sheet 1

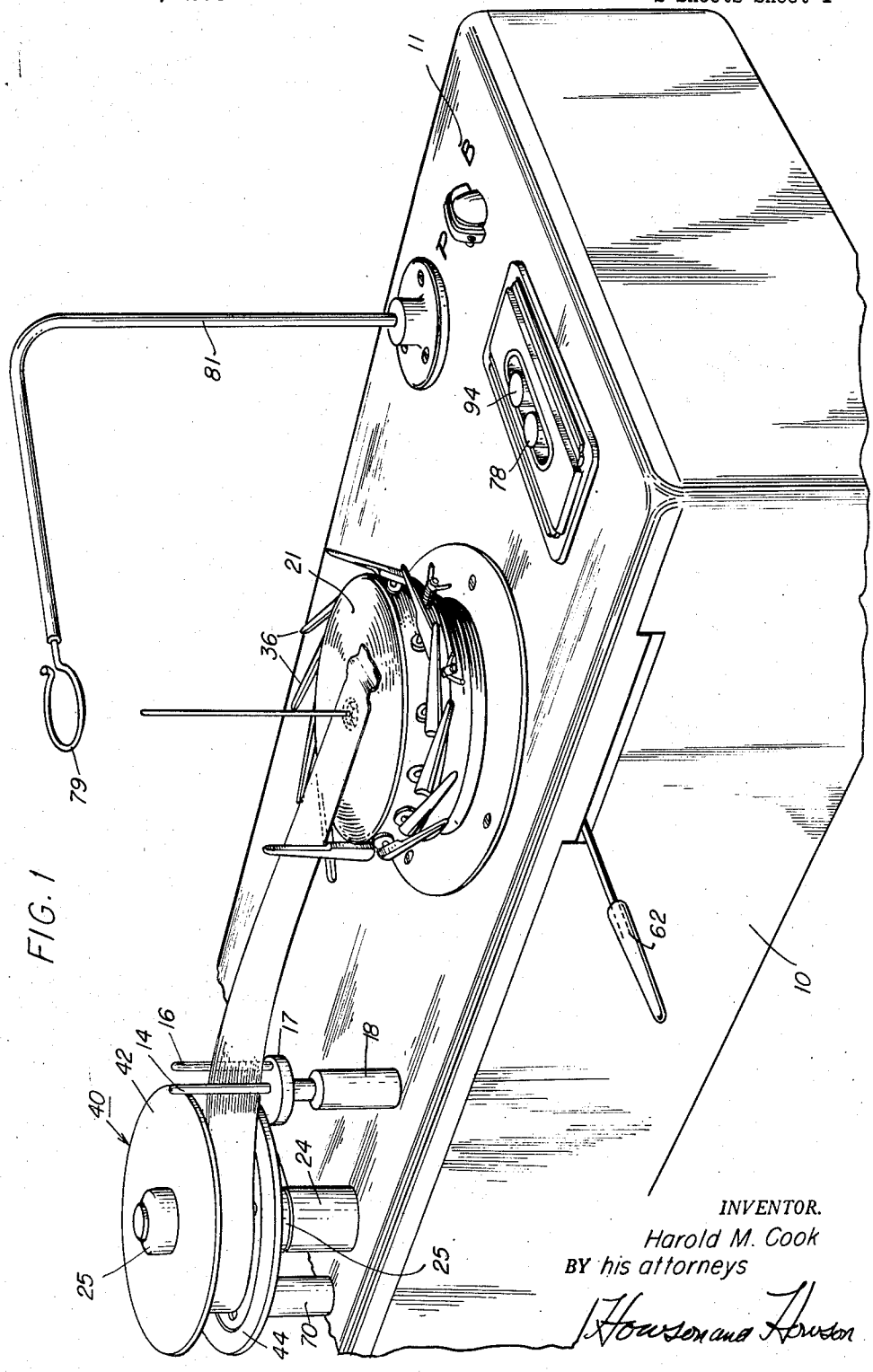


FIG. 1

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FIG. 2

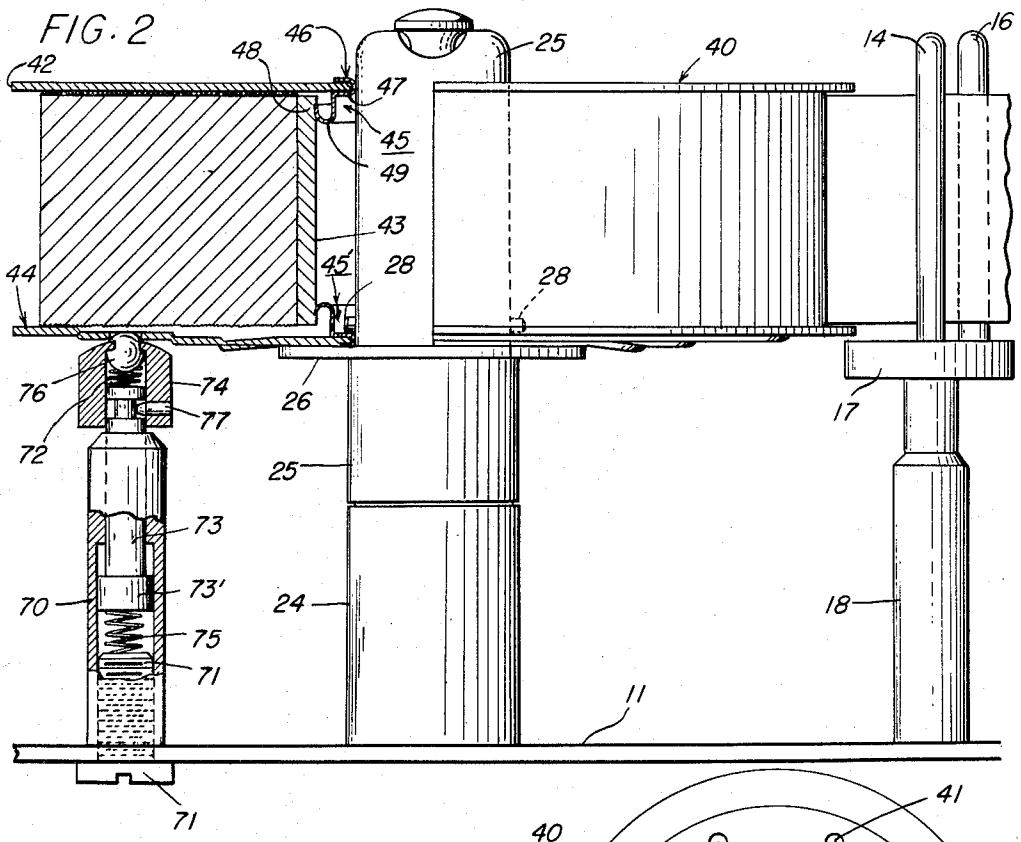
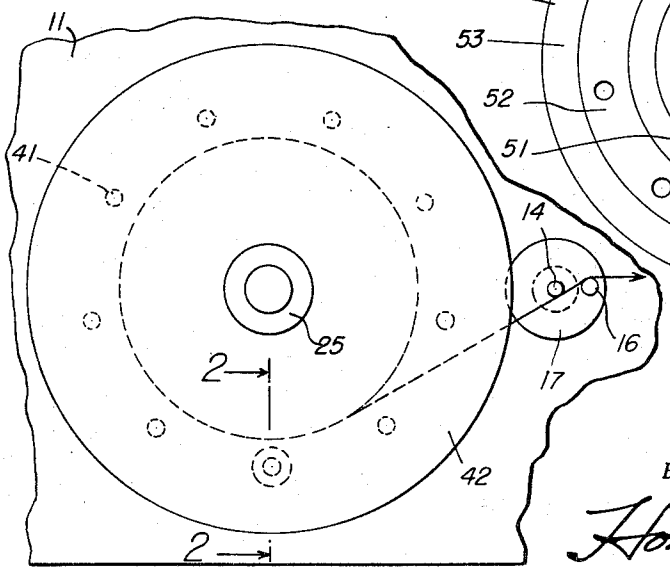


FIG. 3



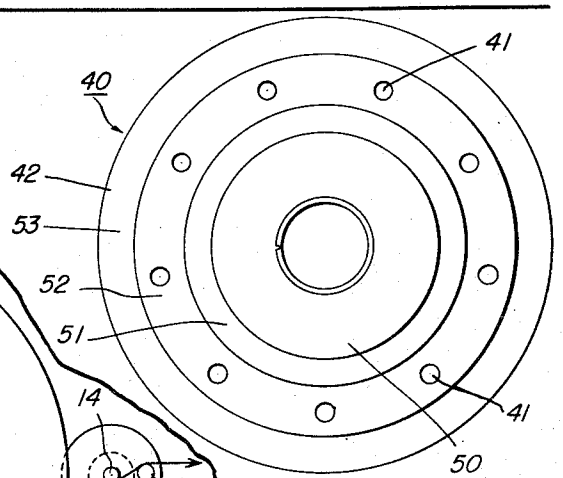


FIG. 4

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2,775,377

MACHINES FOR PRODUCING BOWS AND POMPONS FROM RIBBONS

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Application October 4, 1954, Serial No. 459,941

8 Claims. (Cl. 223—46)

This invention relates to improvements in a machine for forming bows and pompons and more particularly to an improved reel and novel supporting and braking means for the same.

The invention is an improvement upon the invention of my prior Patent 2,528,820, issued November 7, 1950.

In machines of the type above mentioned, there is a tendency for the reel to overrun particularly when the reel is full of ribbon because at that time, the reel has considerable weight and as it rotates it has considerable momentum. If the reel gets rotating too fast, the momentum can cause it to overrun with a concomitant tendency of the ribbon to bunch up or bow out between the reel and the forming implements of the machine.

Therefore, it is an object of the invention to provide improved means such as braking or retarding means to overcome the tendency of the reel to override on machines of the type above mentioned.

Another object of the invention is to provide means to exercise a reduced braking effect when the weight of the reel decreases as the amount of ribbon remaining thereon becomes less and less.

A related object is to provide a reduction in braking effect that is approximately in direct proportion to the reduction in diameter of the reeled ribbon as the ribbon unwinds from the reel, thus to maintain constant ribbon tension for creation of pompons or bows with uniform petals or loops from the full to the expiring reel.

Another object is to provide a reel superior to a standard reel in its tendency to maintain the ribbon wound on the reel, particularly when the reel is fully wound with ribbon, without interfering with the use of the reel on the bow-forming machine above mentioned.

Other objects and advantages of the invention will become apparent as it is described in connection with the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of a machine to which the invention has been applied.

Fig. 2 is a side view partly in section along line 2—2 of Fig. 3 of the reel and braking means of the invention.

Fig. 3 is a plan view of Fig. 2.

Fig. 4 is a bottom plan view of the reel.

For the purpose of illustration the invention is shown in the drawings as applied to a machine which may be enclosed in a housing of generally rectangular or other suitable shape having a top deck or platform **11** on which are mounted the loop-forming implements. These may comprise a turntable **21** having vertically movable pegs or fingers **36** mounted on oscillatable radial shafts extending through the skirt of the turntable.

The turntable **21** and its fingers **36** are operated by motor driven mechanism under the top deck **11** by means as described in my prior Patent 2,528,820 to which reference may be had for details. The mechanism is started by a push button **78** and may be stopped at any time by a push button **94** in case of need. An adjustment lever **62** extends from the housing **10** and enables variation in the

number of loops in the bow or pompon. An auxiliary wire ring **79** on a bent rod standard **81** mounted on the platform facilitates the tying of the bow after its loops have been formed.

According to this invention, ribbon is fed from a reel **40** to loop forming implements through a pair of parallel vertical closely-spaced ribbon-guide pins **14** and **16**. These pins project up from and are rigidly mounted on a small annular disc or platform **17** on a vertical supporting post **18** which in turn is mounted rigidly on the machine deck **11**.

In order to support the reel **40** revolvably, a vertical spindle **24** is rigidly mounted on top of the deck **11** at a location further from the forming implements than the guide pins **14** and **16**, as will be hereinafter more particularly described.

The upper end of the reel spindle **24** is reduced in diameter and has a sleeve **25** revolvably mounted thereon. To support the reel, an annular radially extending platform or reel-supporting flange **26** is rigidly mounted on the sleeve part way up the sleeve. The central part of the reel rests thereon.

The plane of the top surface of the reel-spindle flange **26** is below the plane of the top surface of the finger-guide-post flange **17** to accommodate the novel reel structure hereinafter described.

To hold the reel on the spindle, a pair of diametrically opposite radial short pins **28** extend from the top portion of the sleeve **25**, a distance above the flange **26** approximately the same as the thickness of the bottom flange **44** of the reel **40** around the central hole therein where a ferrule **45'** is connected thereto, as hereinafter described.

The reel comprises upper and lower circular flanges **42** and **44** which may be of cardboard and connected by a cylindrical cardboard hub or tube **43** by means of identical upper and lower annular ferrules **45** and **45'**. The ferrules may be stamped from thin sheet metal and formed with a reversely bent exterior lip **46** which is folded around the peripheries of a central hole in the top and bottom flanges **42** and **44**. The ferrules have a cylindrical wall or connecting collar portion **48** paralleling the spindle sleeve **25** and connected to the exterior lip portion by a radially extending disc portion **47**. Thus, the collar portion **48** is spaced from the spindle sleeve **25** a short distance and extends a short distance into the hub.

In order to secure the flanges on the hub, the edge of the collar portion **48** is reversely bent outwardly nearly 180° forming a lip **49** having a sharp edge. The diameter of the periphery of this lip is slightly greater than the internal diameter of the hub and is inserted into the hub. Hence, after the ferrules are forced into the hub in attaching the flanges to the hub, the lips bite into the hub when any attempt is made to pull the ferrule and flange away from or off of the hub.

Lower ferrule **45'** is pressed into tube **43** the correct distance so that the central portion of flange **44** is slightly concave which, due to the inherent spring effect of the material of which that flange is made, provides a positive clamping action between supporting flange **26** and locking pins **28**. (See Fig. 2 for visual explanation.) This positive clamping action at the center of flange **44** provides the required uniform pressure against the ball **76** and plunger **73** (hereinafter more fully described) at all positions of the reel rotation on its axis.

A plurality of wide concentric rings **51**, **52**, **53** are pressed in the lower flange at different distances from the center thereof so that each annular ring or section is offset from the succeeding annular section and is spaced more closely to the upper flange than the center of the reel and than the neighboring annular sections nearer the center of the reel. By that construction, lateral pres-

sure is applied to the edges of the ribbon that is wound upon the reel which tends to keep the ribbon wound up, particularly when the reel is full; and other important advantages are also accomplished as will hereinafter be described. Due to the offsetting of the peripheral or outermost annular section 53 from the plane of the innermost annular section 50 of the lower flange, the edge or periphery of the lower flange will clear the guide-pin-supporting flange 17 on the guide-pin-supporting post 18 even though the plane of the flange on the reel supporting sleeve is lower than the plane of the top of the flange 17. It is desirable of course that the plane of the tops of these two flanges be somewhere near the same level because of the tendency of the ribbon to drop down when it is not being wound into a bow but is merely being supported between the guide pins, as will be the case when the machine is being set up for the winding of a new bow.

Preferably, flange 17 is placed beneath annular step 53 with just sufficient clearance for a true-running reel. The reel has considerable flexibility when turning on its central axis, especially with ribbon of "lacy" material. Likewise, a reel of this soft ribbon may be deformed by unduly rough handling, so that the lead of ribbon from the reel is not pulled squarely into the machine turntable. As a result, it may be impinged by turntable fingers 36 which in their horizontal position should pass freely beneath the incoming ribbon lead. Due to the flexible construction of the reel, after one or more revolutions it is restored to a true-running condition by annular section 53 momentarily rubbing on the upper surface of flange 17. Still another advantage of the truing-up effect of flange 17 at the extreme outside edge of the reel, is that it enables the hereinafter described ball and plunger which are located closer to the center to provide smoother braking.

As the machine operates in the winding of a bow, the reel rotates. When the reel is full of ribbon, it is relatively heavy and, when rotating, has considerable momentum. There is unfortunately a tendency of the reel to override and hence, for the ribbon to bunch up or bend between the reel and the forming implements despite the presence of the guide pins 14 and 16. In order to overcome this tendency to override, a braking means is provided acting upon the reel. This braking means is supported from a cylindrical pin or post 70 which is secured to the deck 11 by a screw bolt 71 passing through the deck into a tapped bore in the bottom end of the post.

A cylindrical plunger 73 slides in an axial bore in the top of the post 70 and is pressed upwardly by a coiled compression spring 75 which rests on the end of bolt 71 and presses against the bottom of the plunger. To limit the upward or outward movement of the plunger, an enlarged head 73' is formed on its bottom end and the bore for the plunger is enlarged to accommodate the head.

The upper end of the plunger extends from the post 70 and carries a ball retaining cylindrical cap 74 which has an axial bore narrowed at its top within which is seated a spring pressed ball 76. A spring 72 presses the ball upwardly so that the upper portion thereof extends beyond the cap, the lower end of the spring being seated on the top of the plunger 73 within the cap 74. A diametrical pin or set screw 77 in the cap engages the plunger and holds the cap, ball and spring on the plunger.

The urge of spring 75 causes the cap 74 always to contact the bottom surface of the bottom reel flange 44. By reason of this pressure on the bottom reel flange and the concentric steps embossed in that flange, the reel successively deflects upwardly each time the ribbon diameter decreases past one step. The spring 75 is proportioned to give progressively decreased pressure of the cap 74 against the lower reel flange as it deflects upwardly. Thus the concentric steps formed on the reel not only augment rigidity of a full reel but also mechanically provide progressively reduced braking and minimize irregularities due to normal variations in functional coefficient and deflection.

I have found that the braking action of the ball upon the reel is improved by the provision in the bottom surface of the reel of a series of recesses or circular apertures 41 spaced approximately 20° apart. However, the spacing of the apertures may be at a greater or lesser distance within the scope of the invention. The apertures are located in the circumference of a circle whose diameter is equal to the distance from the axis of the reel spindle post 24 and the axis of the ball post 70. Thus, the ball is adapted to seat in one or another of the apertures as the reel rotates. The reel thus rotates with a step-by-step motion. This not only prevents the overrunning of the reel but also brings the reel to a definite stopping point after a bow or pompon has been completely wound. It also tends to hold the reel in fixed position when the machine is being set up for the winding of the next bow or pompon.

Due to the nature and functioning of the winding mechanism, the reel speed accelerates from 0 to maximum and then rapidly decelerates to 0 every half revolution of the turntable. The "step-by-step motion" occurs during deceleration. An important advantage of using the ball 76 in addition to the friction of cap 74 is that the overall braking effect is less dependent upon frictional coefficient of the flange. Hence, the total spring pressure can be reduced to avoid abrasion. The plunger spring is stronger than the ball spring 72 so that cap 74 rides squarely against flange 44 when the reel is full of ribbon. As the diameter decreases and the flange deflects upward, the ball does not seat so deeply in holes 41 thereby reducing the escapement effect of the ball.

From the foregoing, it will be observed that my new form of reel when used in connection with the above described machine, provides means for preventing the overrunning of the reel as the machine is operated. Also, the reel provides tension upon and means to hold the ribbon between the flanges most effectively at the time that the reel is fullest, which is when such holding effect is most needed.

As the reel unwinds and the amount of ribbon thereon decreases, the periphery of the lower flange will tend to move toward the upper flange and the frictional engagement of the flange with the edge of the ribbon will lessen. This tends to reduce the pressure of the lower flange upon the ball 76. That action is desirable because as the ribbon is used up from the reel, the weight of the reel plus the ribbon thereon are constantly decreasing and the tendency of the reel to rotate and overrun decreases. The formation of the bottom flange according to the description above thus has a salutary effect from a number of points of view.

Many modifications within the scope of the invention will occur to those skilled in the art. Therefore, the invention is not limited to the exact form and detail as illustrated and described.

What is claimed is:

1. In a pompon and bow-forming machine, mechanism for forming a plurality of radiating loops, means for feeding ribbon to said mechanism comprising a reel spindle mounted on the machine and having revolvable reel-supporting means thereon, a ribbon guide through which said ribbon passes from the reel to said mechanism, a ribbon-carrying reel supported on the reel-supporting means, means to hold said reel on said reel-supporting means, and means to retard the rotation of said reel as ribbon is drawn from the reel and to oppose overrunning comprising a spring pressed element engaging the surface of the reel to frictionally retard rotation of the reel.

2. The combination of a reel and a machine as claimed in claim 1 wherein the reel has a flange with a plurality

of recesses formed therein located to be successively engaged by said spring pressed element.

3. In a pompon and bow-forming machine, mechanism for forming a plurality of radiating loops, means for feeding ribbon to said mechanism comprising a reel spindle mounted on the machine and having reel-supporting means thereon, a ribbon guide through which said ribbon passes from the reel to said mechanism, a ribbon-carrying reel supported revolvably on said spindle, and means to retard the rotation of said reel as ribbon is drawn from the reel and to oppose overrunning comprising a rotatable member supported from the machine in position to engage the surface of the reel and exercising a drag thereon to oppose overrunning by the reel.

4. The combination of a reel and a machine as claimed in claim 3 wherein the reel has a bottom flange with a plurality of recesses formed therein located to be successively engaged by said rotatable member and to maintain said reel in one of a number of predetermined positions when at rest.

5. In a pompon and bow-forming machine, mechanism for forming a plurality of radiating loops, means for feeding ribbon to said mechanism comprising a reel spindle mounted on the machine and having revolvable reel-supporting means thereon, a ribbon guide through which said ribbon passes from the reel to said mechanism, a ribbon-carrying reel supported revolvably on said spindle, means to hold said reel on said reel-supporting means and to maintain the axial position of the reel relative to said spindle, and means to retard the rotation of said reel as ribbon is drawn from the reel and to oppose overrunning comprising an element supported from the machine in position to engage the surface of the reel and exercising a drag to oppose overrunning by the reel, said reel having top and bottom flanges of which at least

one is of flexible material, said flange having its periphery move closer to the upper flange as the amount of ribbon on the reel decreases whereby less frictional drag is exerted as the reel becomes exhausted.

6. The combination as claimed in claim 5 wherein said flexible flange has a plurality of recesses in the circumference of a circle concentric with the reel axis, said element of the retarding means being a spring-pressed ball engageable in said recesses maintaining said reel in one of a number of positions when at rest.

7. The combination as claimed in claim 6 having a post mounted on the machine, means carried by said post having a recess for said ball, and a spring carried by said post pressing said last-mentioned means toward said flexible flange and into engagement therewith.

8. The combination as claimed in claim 5 having a post mounted on the machine, means carried by said post engageable with said flexible flange, and spring means carried by the post urging said last-named means toward said flange.

References Cited in the file of this patent

UNITED STATES PATENTS

1,396,481	Vaughan	Nov. 8, 1921
1,665,207	Howell	Apr. 10, 1928
2,001,780	Fry	May 21, 1935
2,059,765	Adams	Nov. 3, 1936
2,285,732	Markle	June 9, 1942
2,528,820	Cook	Nov. 7, 1950
2,668,024	Campbell	Feb. 2, 1954

FOREIGN PATENTS

708,448	France	Apr. 28, 1931