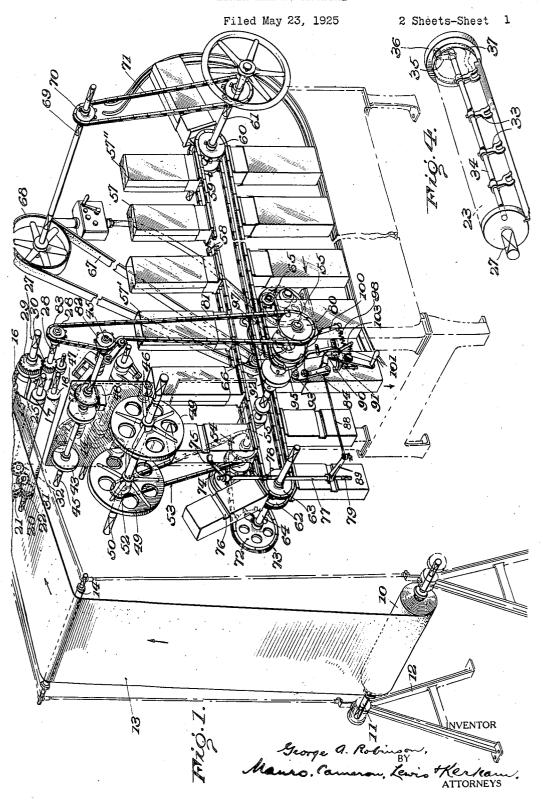
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LINER MAKING MACHINE

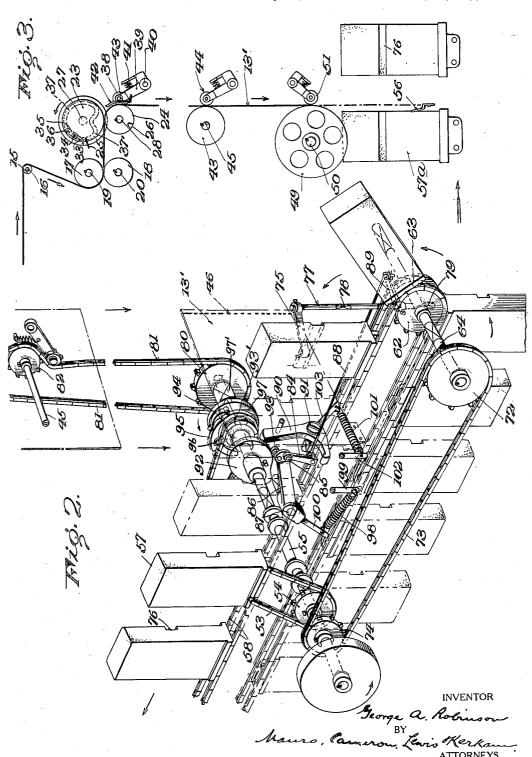


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LINER MAKING MACHINE

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2 Sheets-Sheet 2



STATES PATENT UNITED

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LINER-MAKING MACHINE.

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The present invention is an improvement in mechanism for forming bags or liners for use alone or for use in cartons or other con-More especially the invention is 5 an improvement in means for feeding the sheet of paper that is to constitute the bag or liner rapidly and accurately in position in front of a moving form, about which the sheet is to be wrapped or made into the 10 bag or liner.

The invention relates more particularly to the type of machine shown in the patent to George H. Bent, No. 1,480,143, dated January 8, 1924, in which both the liner and 15 the carton are made up about moving forms; though it is to be understood that this device is utilizable in the making of paper bags

or liners to be used alone.

In view of the fact that the bags or liners 20 are made up around moving forms on an endless conveyor that pass a given point at the rate of approximately 60 per minute, a substantial problem is presented in feeding the liner sheets accurately and swiftly in 25 position in front of successive forms and to maintain the sheets in the feeding operation unwrinkled. Further, when a strip of adhesive is to be applied to the sheet the matter of feeding the sheet accurately aligned and rapidly is rendered more difficult, as the adhesive should be applied when the sheet is moving at a relatively low speed in order that the adhesive may be applied along the entire line of the sheet and without splashing of the adhesive.

desirable to provide two sets of sheet feed rollers, one set of which travels at a much higher surface speed than the other set. The sheets are preferably first severed from a web by any suitable cutting or severing mechanism and are then fed into engage-ment with the first set of feed rollers, though sheets fed from a pile might be used. 45 If a strip of adhesive is to be applied to the sheet, the gluing mechanism is preferably set f positioned in association with this set of tail. rollers, which latter delivers the sheets into

operative engagement with the second or high speed set of rollers. The forward edge 50 of the sheet is engaged by the high speed rollers before the tail or rear edge of the sheet passes out of the control of the first set of feed rollers, thus maintaining control of the sheet at all times, insuring the 55 delivery of the sheet in proper position with its lower edge horizontal, and insuring the application of the glue along the entire line of the sheet and before the speed of movement of the sheet is accelerated by the high 60 speed rollers. Further, the fact that the sheet is subject to the action of the two sets of feed rollers at the same time, one set operating at a higher surface speed than the other, operates to preserve the sheet in an 65 unwrinkled condition.

The sheet after it passes under the control of the high speed rollers is then rapidly delivered into position to be wrapped about the form. It sometimes happens that 70 a liner already made up about one of the moving forms will not be discharged from the same and will return to the sheet wrapping position. Accordingly, a safety mechanism is provided to prevent the feed of a 75 second sheet about the liner on the form, preferably in the form of a clutch mechanism the driven side of which is connected to and drives the first or low speed set of

feed rollers. The invention also resides in means for insuring the accurate downward feed of the sheet as the same passes around the severing of the adhesive.

Under these conditions it has been found Under these conditions it has been found ing mechanism. The path of the sheet is preferably changed at this point and the strength of the sheet is to continue its horizontal methods at a much included of the sheet is to continue its horizontal methods at a much included of the sheet is to continue its horizontal methods at a much included of the sheet is to continue its horizontal methods at a much included of the sheet is the same passes around the severing mechanism. The path of the sheet is preferably changed at this point and the same passes around the severing mechanism. izontal movement in the direction in which it approaches the severing mechanism; and it has therefore been found desirable to provide control mechanism at this point to 90 insure the proper translation in movement

of the sheet. Other improvements and features will be set forth as the invention is described in de-

The invention will be better understood

illustrating one expression of the inventive idea, and in which,

Fig. 1 is a perspective view of the improved mechanism applied to a so-called

'liner" machine;

Fig. 2 is a detail perspective showing particularly the construction and mounting of the clutch mechanism which operates to 10 stop the sheet feed if a liner has not been removed from the form;
Fig. 3 is a side elevation showing the re-

lation of the sheet severing mechanism, the feed rolls, and the severed sheets in differ-

15 ent positions; and

Fig. 4 is a detail view showing the means for insuring the downward feed of the sheets as they pass around one of the cut-

ter rolls.

The invention will be better understood by reference to the accompanying drawings, in which like reference numerals indicate like parts. As indicated above the invention is particularly adapted for use in con-25 nection with machines of the general structure indicated in the Bent Patent No. 1,480,143. As herein shown a roll of paper 10 is supported on a shaft 11 mounted in standards 12, and the web of paper 13 is fed 30 upwardly from said roll, passing over a suitably supported guide roll 14 and thence over a second guide roll 15 loosely mounted on a shaft 16, thence downwardly between rollers 17 and 18 mounted respectively on driven shafts 19 and 20. These rollers 17 35 driven shafts 19 and 20. and 18 are preferably metal rolls, and shafts 19 and 20 carry, respectively, gears 21 and 22 that intermesh and insure the rotation of said shafts to feed the web horizontally 40 into engagement with the severing mechanism. This severing mechanism is preferably in the form of a pair of cooperating rollers 23 and 24, one of which carries a cutting blade 25 and the other of which is provided with a recess 26 that cooperates with said blade. The roller 23 is mounted on driven shaft 27 and the roller 24 is mounted on the driven shaft 28. The shaft 27 carries a gear 29 and the shaft 28 carries a gear 30 which meshes with the gear 29. The shaft 28 is driven from the driven side of a clutch mechanism, hereinafter more fully described, and the cutter rolls and the feed rolls 17 and 18 are also driven from The feed rolls 17 and 18 are this shaft. connected to and driven from shaft 28 through an intermediate idler gear 31 mounted on a stud carried by the frame of the machine, this idler gear 31 meshing with gear 32 on shaft 28 and also with gear 32' carried by shaft 20.

In order to accurately and definitely change the path of the sheet from horizontal

by reference to the accompanying drawings, roller 24 on its way to the sheet feed rollers, 66 a plurality of guide fingers 33 are mounted on a shaft 34 carried by the cutter roller 23. The shaft 34 on which the fingers 33 are mounted, is provided with an arm 35, positioned outside of the roll 23, and this arm 70 35 carries a roller 36 that engages a heart-shaped cam 37, which cam 37 is concentric with shaft 27 and is mounted on one of the side frames of the machine. The sheet passes downward around roller 24, against 75 which it is held by a tension roller 38 carried by arm 39 pivoted at 40, a spring 41 holding the sheet against the roller 24. As the front edge of the sheet passes between the rollers 23 and 24 the guide fingers 33, 80 under the influence of part 37' of the cam 37, are swung downwardly substantially conforming to the curvature of the roll 24 and guiding the sheet into the bite of rollers 24 and 38 and insuring the accurate and 85 proper translation in movement of the sheet. As the roller 23 continues to rotate the guide fingers 33 are returned to the fullline position shown in Figure 3. In order to further insure the accurate initiation of 90 the movement of the sheet downwardly, there is preferably also employed a plurality of stationary curved guide fingers 42 mounted on a bar 43, these fingers being spaced between the pair of tension roll- 95

> As the sheet passes downwardly between the rollers 24 and 38, the forward edge of the sheet is engaged by a plurality, preferably two, sheet feed rollers 43, against which 100 rollers the sheet is held by tension rollers 44 similar in construction and operation to tension rollers 38. The forward edge of the sheet is engaged between the rollers 43 and 44 before the rear edge of the sheet passes 105 out of engagement with rollers 24 and 38, to insure control of the feed of the sheet. The rollers 43 are mounted on a shaft 45 which shaft 45 is driven from the same source as shaft 28 and the rollers 43 are 110 driven at only a slightly higher surface

speed than rolls 24. A line of adhesive indicated at 46 (Fig. 1) is preferably applied to the sheet as it is progressed downwardly. This adhesive 115 is preferably applied by a glue roller 47 mounted on shaft 45, and taking the glue from a guitable fountain or recent 40. from a suitable fountain or receptacle 48. The glue is applied to the sheet while it is moving at the surface speed of the rollers 120 43, and the glue is applied to the sheet throughout its linear extent, along the line indicated, before the forward edge of the sheet passes under the control of the high speed rollers 49. This is important in insuring the accurate and proper application of the strip of adhesive and to prevent the to vertical as it passes downwardly around glue from being splashed about, which

to the sheet while it was being fed by the

high speed rollers. The high speed rollers 49 are mounted on 5 a shaft 50, and preferably two such rollers are employed. The sheet is held in engagement with said rollers by means of tension rollers 51. Shaft 50 carries a sprocket wheel 52 around which passes a sprocket chain 53 10 that also passes around a sprocket wheel 54 on a shaft 55 that carries the clutch, hereinafter referred to. These high speed rollers 49 are driven at a speed considerably in excess of the speed of rollers 43, and a surface speed 15 of rotation of rollers 49 about four times as high as the surface speed of rotation of feed rollers 43 has been found to be desirable. In view of the speed of travel of the forms about which the liners are to be wrapped and of 20 the close spacing of the forms on the conveyor that carries the same, it is necessary, after the sheets have been supplied with the line of adhesive, to insure their rapid and accurate delivery in position in front of the proper form. As indicated above, when the advancing edge of the sheet has passed into the bite of rollers 49 and 51 the rear edge of the sheet is still within the bite of the rollers 43 and 44. It is noted that the tension on 30 the rollers 44 is heavier than the tension on the rollers 51, in order that the rear edge of the sheet shall be held against the rollers 43 and controlled thereby even after the front edge has passed into the bite of rollers 49 and 35 51, to insure the sheet being fed at the speed of the rollers 43 until the rear edge of the sheet has passed out of the bite of rollers 43 and 44. This control of the sheet insures that the adhesive is accurately and properly applied and that the lower edge of the sheet shall be maintained in a horizontal position for proper positioning in front of the form; and the differential speed of movement be-tween the rollers 43 and 49 insures that the 45 sheet so delivered will be unwrinkled and in perfect condition. The control of the sheets in this manner by the cooperative action of the rollers 43 and 49 obviates the necessity for any side registering of the sheet after it 50 has reached its wrapping position in front of the form; and the high speed of movement of the sheet under the influence of the high speed rollers 49, after the glue has been applied to it, insures its presentation to its correspond-55 ing form in time for the wrapping operation.

The sheet is deposited by the rollers 49 on a pair of stops or supports 56 that are carried by a stationary plate on the frame of the machine, and the sheet is removed from these 60 supports by one of the traveling forms 57. These forms are carried by a conveyor 58 preferably constituted by a pair of sprocket chains which pass around sprockets 59 and also passes around a sprocket wheel 82 on

would be the case if glue were being applied against the liner sheet, positioned in its path, insures the wrapping of the liner around the advancing and side faces of the form, and any suitable mechanism, such as that disclosed in Bent Patent No. 1,480,143, may 70 be employed for folding the rear projecting edges of the liner against the rear face of the form. The edge of the sheet that carries the line of adhesive is folded down on the other rear edge of the liner and caused 75 to adhere thereto in any suitable manner. Likewise, the portions of the liner that project above the form may be folded and secured, if desired, in any suitable manner such as that disclosed in Bent Patent No. 1,480,- 80 143. The sheet thus formed into a bag or liner may be removed from the form in any suitable manner, either before or after a carton has been placed or formed on the form around the liner. As seen in Figure 1, a 85 liner is shown with portions projecting upward above the form at 57' and the complete liner as formed is shown at 57".

The drive for the described mechanism is effected by a motor 65 which carries a small 90 pulley 66 on the armature shaft, a belt 67 passing around said pulley and around a pulley 68 carried by shaft 69. Shaft 69 is provided with a sprocket wheel 70 that drives shaft 61 through sprocket chain 71. The na form conveyor 58 is driven from shaft 61 and the movement of conveyor 58 effects the rotation of shaft 64, which latter carries a sprocket wheel 72 around which passes a sprocket chain 73 that also passes around a 100 sprocket 74 on shaft 55 and drives the latter. Power is conveyed from shaft 55 to shaft 50 through sprocket chain 53 as heretofore de-

scribed.

In the event that a liner should not be re- 105 moved from its form and should again approach the sheet delivery position, it is desired to prevent a second liner from being wrapped around the first. To avoid such a contingency a detector finger 75 is pro- 110 vided and this finger is adapted to engage in a slot 76 carried by each of the forms 57. The detector finger is positioned to engage the slot in the form one removed from the position in which the sheet is engaged by 115 the form. This finger is mounted on a vertical shaft 77, preferably carried in a pair of ball bearings at 78 and 79, and connections are provided from this shaft to the clutch mechanism to open the same should 120 a liner on the form prevent the detector finger 75 from entering the slot 76. This clutch is of any suitable or well known construction, and is provided with a driving part and a driven part, both mounted on shaft 55. The 125 driven part carries a sprocket wheel 80 around which passes a sprocket chain 81 that 60 on shaft 61 and sprockets 62 and 63 on shaft 45 and a sprocket wheel 83 on shaft 28.
65 shaft 64. The movement of the form 57 Accordingly, when the clutch is opened, 130

shafts 45 and 28 at once cease to rotate. This insures the stoppage of the sheet severing mechanism and also the stoppage of the low speed sheet feed rolls 43. The clutch 5 is so arranged that when the same is opened. the feed will be interrupted in such a position that the sheet that is about to be cut from the web will still be in engagement with the severing mechanism, but, in view of the fact to that the high speed rolls 49 are continuously driven, the sheet that has already been severed and which, in the position of the parts as indicated in Figure 3 is about to pass under the influence of the high speed rollers 15 49, will be delivered in position to be wrapped about the approaching form 57°. The form following 57° is the one on which

the liner is already present. The particular form of clutch that is illus-20 trated herein employs a punter 84 pivoted at 85 to one end of an arm 86 pivoted to the frame of the machine at 87. The lower free end of the punter 84 is connected to one end of a link 88, the other end of which is connected to the free end of an arm 89 carried by vertical shaft 77. Normally the detector finger 75 and the link 88 hold the lower end of punter 84 in position over the horizontal arm of a bell crank lever 90 pivoted at 91, to rock said lever by the action of a cam 92 carried by shaft 55, said cam engaging a roller 93 carried by arm 86. When the punter 84 rocks the bell crank 90 the vertical arm thereof moved out of the 35 course of travel of a clutch pawl 95 (Fig. 2) and the clutch is maintained closed, but if the punter should not rock the bell crank 90, as would be the case if the detector finger were unable to enter the slot 76 due to the presence of a liner, the vertical arm of said bell crank would remain in the path of travel of pawl 95, strike the tail or left hand end thereof (Fig. 2), and operate to disengage the clutch. A disk 93' is pro-vided with a single tooth 94 and this disk continuously rotates with shaft 55 in the direction of the arrow, as in Figure 2. In driving position this tooth is engaged by the nose of pawl 95 which is pivoted at 96 on a second disk 97 mounted on a sleeve 97' loose on shaft 55. The sprocket 80 is fixed to this sleeve and rotates when said sleeve rotates. The vertical arm of the bell crank 90, as before stated, is normally removed from the 55 path of the pawl 95, but in the event that the detector mechanism operates, this vertical arm remains in the path of the pawl 95, engages the tail of said pawl, and accordingly trips the same and disengages the on nose of the pawl from the tooth 94, thus leaving the disk 97 and sprocket 80 stationary, stopping the operation of the paper feeding and cutting mechanism, and interrupting the feed of the sheet above the high speed rollers 49.

The roller 93 is held in engagement with the cam 92 by means of a spring 98, one end of which is anchored to the frame of the machine at 99 and the other end of which engages the free end of an arm 100 secured 70 to the arm 86. The bell crank 90 is rocked into position so that its vertical arm will be in the path of the pawl 95, by means of a spring 101, one end of which is anchored to the machine at 102 and the other end of 73 which is connected to an arm 103 secured to the bell crank 90.

By the present invention the sheets are accurately and rapidly fed into position to be wrapped about the forms and the mecha- 80 nism is adapted to feed said sheets to the forms for the production of a high quality of bag or liner at the rate of 60 or more per minute.

While for the purpose of illustration one 85 expression of the inventive idea has been herein illustrated and described in detail, it is to be understood that the invention is susceptible of expression in various mechanical forms within the limits of the appended 90 claims, and it is also to be understood that the terms "vertical" and "horizontal" as applied to the direction of feed of the sheets are relative terms. It will further be understood that under certain conditions as, for 95 example, where waxed paper is used, it may be unnecessary to apply a strip of adhesive thereto, as the wax coating on the paper could be utilized as the sealing medium.

What is claimed is: 1. The combination with a horizontally movable endless carrier having a form thereon about which a sheet is to be wrapped, of mechanism for feeding the sheet downwardly into the path of travel of the form, said 103 mechanism comprising low speed feeding means and high speed feeding means arranged in spaced superimposed relation above said endless carrier.

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2. The combination with a horizontally 110 movable endless carrier having a form thereon, of means for feeding sheets vertically into the path of travel of the form, said means including low speed feeding rollers and high speed feeding rollers arranged in 113 spaced superimposed relation adjacent the endless carrier, said high speed feeding rollers delivering the sheets into position to be engaged about the form.

3. The combination with a horizontally 120 movable endless carrier having a form thereon, of means for feeding sheets of paper vertically into position to be wrapped about the form, said means including low speed rollers and high speed rollers arranged in 125 superimposed relation adjacent the endless carrier, the high speed rollers being spaced from the low speed rollers so as to engage the forward edge of the sheet before the rear edge thereof has passed the low speed rollers.

for feeding sheets of paper in position to be wrapped about the form and comprising a plurality of low speed rollers spaced apart on a common axis and a plurality of high speed rollers spaced apart on a common axis, and a corresponding number of tension devices associated with both the low speed rollers and the high speed rollers, the tension 10 devices associated with the low speed rollers being stronger than the tension devices associated with the high speed rollers.

5. In combination, an endless carrier having a form thereon, sheet cutting means 15 spaced from the carrier including a pair of rollers one provided with movable fingers arranged to guide the sheets around the other, means for feeding a web to said sheet cutting means, and sheet feeding means interposed 20 between said cutting means and the carrier and comprising a low speed device receiving the sheet from the cutting means and a high speed device receiving the sheet from the low speed device and delivering said sheet in position to be wrapped about the form on said carrier.

6. In combination, an endless carrier having a form thereon, sheet cutting means spaced from the carrier comprising a pair of 30 rollers, a severing blade carried by one of said rollers, and automatically operated fingers carried by the blade roller and shaped to guide the sheet around the other roller, means for feeding a web to the sheet 35 cutting means, and sheet feeding means interposed between said cutting means and the carrier and comprising low speed rollers receiving the sheet from the cutting means and high speed rollers receiving the sheet from 40 the low speed rollers and delivering said sheet in position to be wrapped about the form on said endless carrier.

7. In combination, a movable form around which a sheet of paper is adapted to be wrapped, high speed rollers for feeding the sheets into wrapping position, low speed rollers for feeding the sheets to said high speed rollers, and a liner operated detector mechanism for interrupting the rotation of said 50 low speed rollers when a liner is present on

said form.

8. In combination, a movable form around which a sheet of paper is adapted to be wrapped, a web feeding means, rotary means for severing the web into sheets, sheet feeding means for delivering the sheets into position to be wrapped comprising two sets of rollers, means for driving said sheet severing means and one of the sets of rollers, and a liner operated detector mechanism for preventing rotation of said sheet severing means and said set of rollers when a liner is present on said form.

9. In combination, a moving form about 65 which a sheet of paper is to be wrapped,

4. In combination, a moving form, means means for feeding the sheets into wrapping position in front of said form comprising low speed rollers and high speed rollers, means for continuously driving the high speed rollers, and a liner operated detector 70 mechanism for preventing rotation of the low speed rollers when a liner is present on said form.

10. In combination, a horizontally movable endless carrier having a form thereon 75 about which a sheet of paper is to be wrapped, means for feeding said sheet vertically to a position in front of the form and comprising low speed rollers and high speed rollers arranged in spaced superim- 80 posed relation adjacent the endless carrier, and a glue roller mounted on the axis of the low speed rollers and adapted to apply a

strip of adhesive to the sheet.

11. In combination, a horizontally mov- 85 able endless carrier having a form thereon about which a sheet of paper is to be wrapped, means for feeding said sheet vertically to a position in front of the form and comprising low speed rollers and high 90 speed rollers arranged in spaced superimposed relation adjacent the endless carrier, a glue roller mounted on the axis of the low speed rollers and adapted to apply a strip of adhesive to the sheet, and tension means 95 associated with the low speed rollers and operating to hold the rear edge of the sheet in engagement with the low speed rollers after the front edge of the sheet has been engaged by the high speed rollers and until 100 the rear of the sheet has passed said tension

12. In combination, a horizontally moving endless carrier having a form thereon about which a sheet of paper is to be 105 wrapped, means for feeding the sheet downwardly in front of the form comprising low speed rollers and high speed rollers disposed in spaced superimposed relation over said endless carrier, and means for maintaining 110 the lower edge of the sheet in a horizontal plane, comprising tension devices cooperating with the low speed rollers and the high speed rollers, the tension devices at the low speed rollers being stronger than those at 115 the high speed rollers.

13. In combination, a form about which a blank is to be wrapped, means for feeding blank material toward the form and comprising low speed rollers and high speed rollers, and means adapted to apply a strip of

adhesive to the blank material.

14. In combination, a form about which a blank is to be wrapped, low speed rollers and high speed rollers for feeding the blank 125 to the form, means for applying a strip of adhesive to the blank, and tension means associated with the low speed rollers and operating to hold one edge of the blank in engagement with the low speed rollers after 130

the opposite edge of the blank has been engaged by the high speed rollers and until said first named edge of the blank has passed said tension means.

15. In combination, a form about which a blank is to be wrapped, low speed rollers and high speed rollers for feeding the blank to the form, and means for maintaining the leading edge of the moving blank parallel

with the axes of said rollers and comprising 10 tension means associated with the low speed rollers and tension means associated with the high speed rollers and of less strength than said first named tension means.

In testimony whereof I have signed this 15

specification.

GEORGE A. ROBINSON.