M. H. BALLARD.

LABEL CUTTING MACHINE.

APPLICATION FILED APR. 15, 1911.

1,136,758.

Patented Apr. 20, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

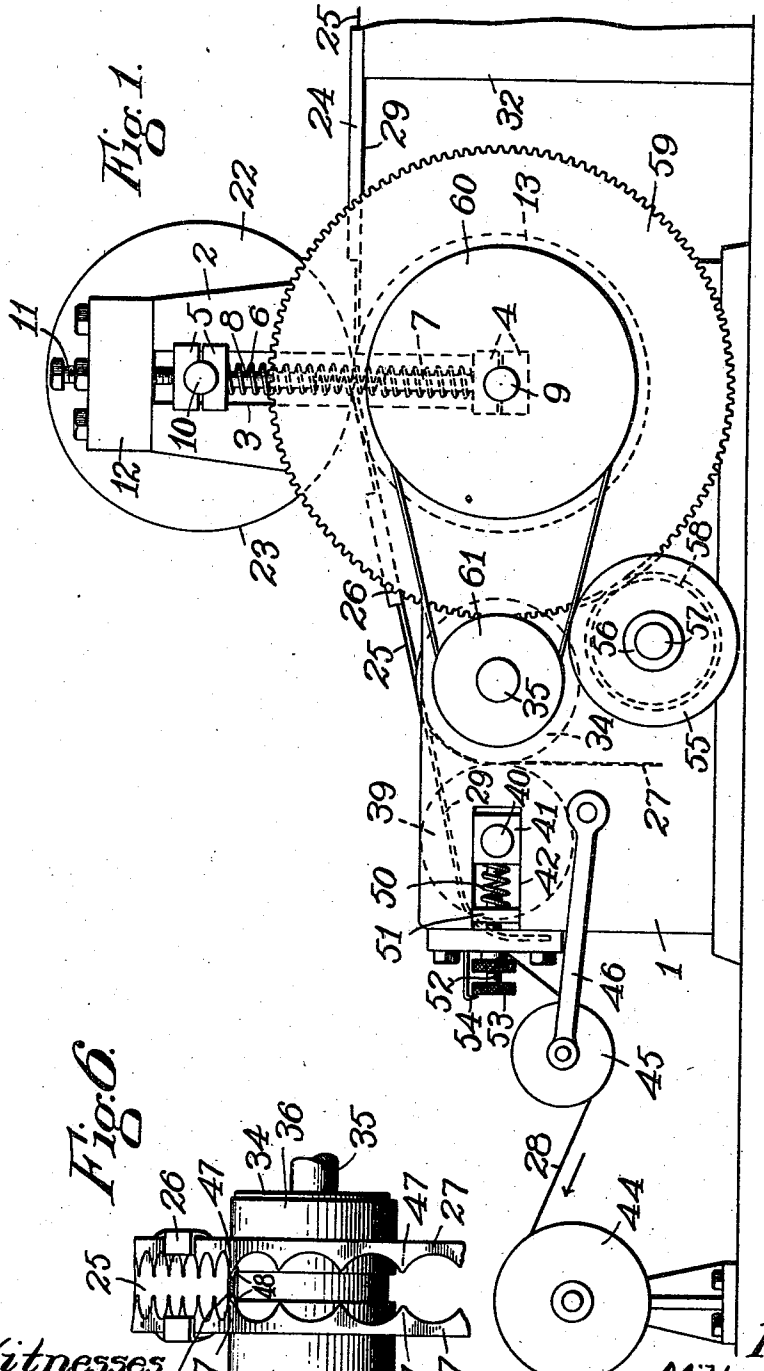


Fig. 8.

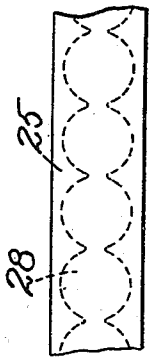


Fig. 7.

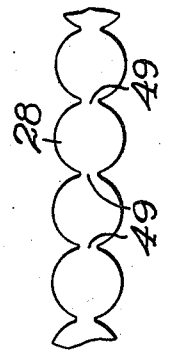


Fig. 6.

Witnesses

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2 SHEETS—SHEET 2.

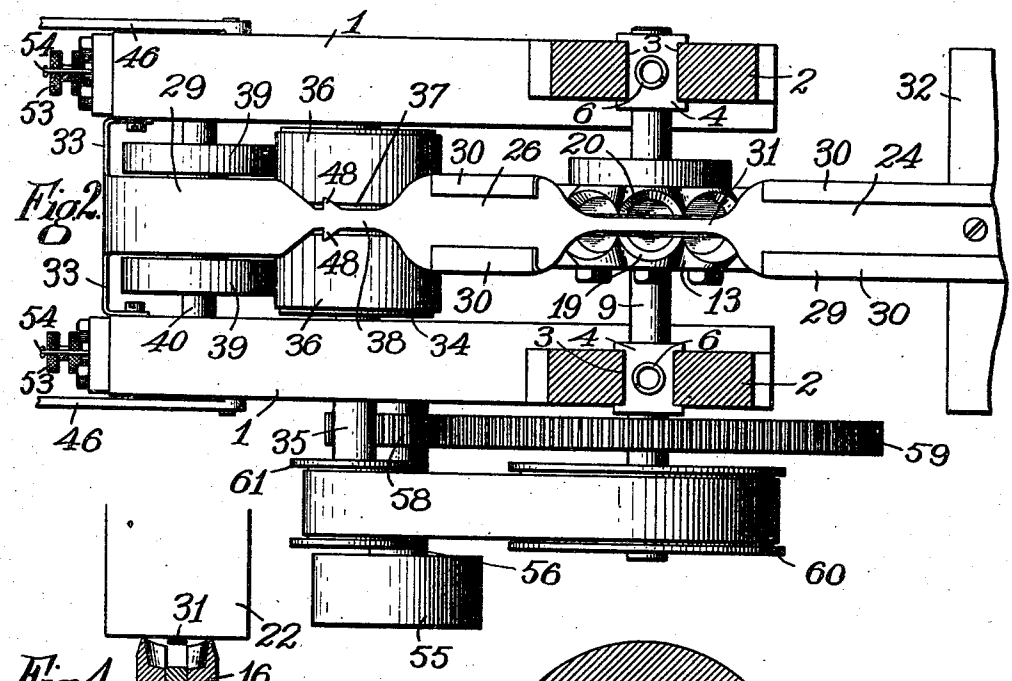


Fig. 2.

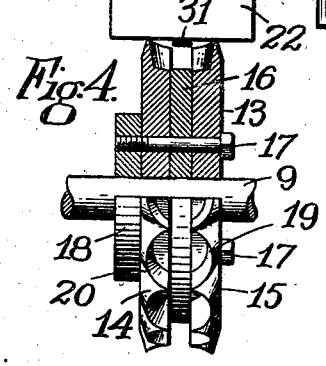


Fig. 4.

Fig. 3.

Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

MILTON H. BALLARD, OF LYNN, MASSACHUSETTS, ASSIGNOR TO TRIPP FRUIT WRAPPING MACHINE COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF MAINE.

LABEL-CUTTING MACHINE.

1,136,758. Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed April 15, 1911. Serial No. 621,276.

To all whom it may concern:

Be it known that I, MILTON H. BALLARD, a citizen of the United States, residing at Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented a new and useful Improvement in Label-Cutting Machines, of which the following is a specification, accompanied by drawings, forming a part of the same.

My invention relates to a machine for cutting labels or similar articles, from a homogeneous fibrous material, such, for example, as paper, cardboard, or similar material.

The objects of my invention are to provide a machine for rapidly producing a series of labels from a continuous strip of paper, with the individual labels preferably connected so as to form a continuous strip of completed labels which may be severed to form individual labels; to provide means for forming the outline of the labels in curved, serpentine, or other fanciful forms; to provide means for securing a predetermined spacing of the labels in the continuous strip in order to enable the strip of labels to be subsequently fed with accurate registration to a label affixing or label printing mechanism; to produce a sharply defined outline of the labels from a fibrous material, such as paper, or cardboard, without requiring the material to be completely severed; to avoid the undue dulling of the cutting mechanism; to accomplish the separation of the side strips or waste from the strip of labels; and to relieve the strip of completed labels from any injurious strains incident to the operation of cutting the labels or separating the side strips therefrom; and these objects, among others, I accomplish by means of the construction and arrangement of parts as hereinafter described, the novel features being pointed out in the annexed claims.

In the accompanying drawings I have shown a label cutting machine containing a preferred embodiment of my invention.

Figure 1 is a side elevation of the machine. Fig. 2 is a plan view with the bed roll removed. Fig. 3 is a vertical, central, longitudinal, sectional view. Fig. 4 is an edge view of the label cutting die with one half shown in central sectional view. Fig. 5 is a plan view of a portion of the separating mechanism for removing the side or waste strips, and having a strip of labels shown in position. Fig. 6 is a rear view of a portion of the separating device partly shown in section. Fig. 7 represents a series of completed labels in a continuous strip. Fig. 8 represents a portion of the continuous strip of paper or other material, from which the labels are cut, the labels to be formed therefrom by the machine represented in the drawings being indicated by broken lines.

Similar reference figures refer to similar parts in the different views.

The machine represented in the accompanying drawings is designed for producing circular or disk shaped labels, although other shapes can be produced if desired.

In the drawings, 1 denotes a framework upon which the operative parts of the machine are mounted, comprising posts 2, 2, inclosing vertical slots 3, 3, in which are placed the boxes 4 for the cutting roll, and the vertically movable boxes 5 for the bed roll. The boxes 4 rest upon the bottom of the slots 3 and the boxes 4 and 5 are separated by spiral springs 6, which are preferably supported in proper position by pins 7 and 8 held in the boxes and entering for a short distance the opposite ends of the springs 6. Journaled in the lowermost box 4 is a spindle 9 upon which the rotating cutter is mounted, and journaled in the box 5 is a spindle 10 upon which the bed roll is mounted, and the desired distance between the axes of the spindles 9 and 10 is maintained by adjusting screws 11 held in the caps 12.

The die forming or cutting roll 13 is composed of a pair of preferably separable disks 14 and 15, having in the present instance an interposed spacing disk 16, all being clamped by bolts 17 to a collar 18 which is carried by the spindle 9. The peripheries of the disks 14 and 15 are suitably shaped to produce the desired form of the label. In the present instance the peripheries of the disks 14 and 15 are provided with a series of semicircular convolutions 19 and 20. The outer edges of the disks 14 and 15 are ground to a true circle 21 concentric with the axis of the spindle 9. Mounted upon the spindle 10 is a bed roll 22, preferably of hardened steel, and having its face 23 ground to a true circle concentric with the axis of the spindle 10. The spindle 9 is held in a fixed position in the boxes 4, and the position of the spindle

10 is adjusted with reference to the position of the spindle 9 by means of the adjusting screws 11, so that the circular edges 21 of the cutting roll 13 and the face 23 of the bed roll 22 will rotate with true relation to each other, and preferably slightly separated, or if in contact, in such delicate contact that the cutting roll 13 is relieved of pressure against the surface of the bed roll, when the two are rotating freely without an interposed material between them.

Mounted upon the framework 1 is a guide 24, by which a strip of paper, cardboard, or similar material 25 (Fig. 1) is conducted between the cutting roll 13 and bed roll 22, and in a plane tangential to the peripheries of the cutting and bed rolls. After passing between the cutting roll 13 and bed roll 22 the strip of material is conducted through a guide 26 to the mechanism for separating the side or waste strips 27 from the continuous strip of labels 28 (Fig. 5).

The guides 24 and 26 consist of a narrow metal plate 29 having its edges turned over to form lips 30 to inclose the edges of the continuous strip 25. The plate 29 is preferably a continuous plate and that portion between the guides 24 and 26 is contracted in width at 31 to allow it to pass between the cutting edges of the disks 14 and 15 forming an elastic or yielding support for the strip of material to be cut, by which the latter is held against the face of the bed roll 22. The plate 29 is attached at one end to a fixed framework 32, and at the opposite end it is attached by arms 33 to the frame 1 forming a support for the continuous strip of material to be cut, and by means of the upturned lips 30, providing guides behind and in front of the cutting roll to maintain the proper alinement of the continuous strip to be cut.

In front of the cutting mechanism I place a mechanism for separating the side or waste strips 27 from the strip 28 of cut labels. The strip separating mechanism also serves the purpose of severing any connecting fibers between the strips 27 and 28 which may pass the cutting mechanism without being separated thereby. The separating mechanism comprises a roll 34 carried on a spindle 35 journaled in the framework 1 and carrying on its periphery bands 36 of rubber, leather, or suitable material to provide a friction surface. A space 37 is left between the friction bands 36 to receive the contracted section 38 of the label supporting plate 29 where it passes over the roll 34.

Bearing against the friction bands 36 are the rolls 39, 39, carried upon a spindle 40, journaled in boxes 41, held in ways 42 of the framework. The rolls 39 are spaced apart sufficiently to allow the continuous strip of labels to pass between them. As the strip 28 passes between the rolls 39 the labels are supported upon the plate 29, from which the continuous strip 28 of labels is conducted to a winding drum 44, which is rotated by any known friction driving device suitable to cause the strip 28 to be wound as fast as delivered from the cutting mechanism, with a tension sufficient to support the weight of a take-up roll 45, journaled in the free end of the swinging arms 46 pivoted to the sides of the frame 1. A sufficient tension upon the strip 28 is maintained to enable it to resist any strains incident to the operation of the separating mechanism.

The separation of the side or waste strips 27 is accomplished by deflecting them downward between the friction bands 36 and the rolls 39, causing the side strips 27 to be drawn down over the roll 34 by the frictional contact of the bands 36, against which the side strips 27 are held by the rolls 39, while the continuous strip 28 of labels is conducted over the plate 29 to the winding mechanism. The forward movement of the label strip 28 and the downward movement of the side strips 27 under suitable tensions has been found sufficient to cause the separation of the side strips, except at those portions where the sharp reëntering angles form the points 47, 47, on the side strips. In order to produce the separation of the points 47 without injury to the labels I provide means for imparting a sidewise strain or one transverse to the continuous strip of labels by forming upon the plate 29 at its contracted section 38, and a short distance in front of the center of the roll 34, the triangular laterally extended wings 48, 48, with their tips slightly beveled upon the upper side.

As the strip 28 of labels moves forward beyond the highest point of the bands 36 the points 47 of the side stripes 27 are carried over the wings 48, and as the strips 27 are drawn downward their points 47 are drawn sidewise over the beveled surfaces of the wings 48, causing a lateral separation between the points 47 and the connecting necks 49 of the labels, thereby producing a complete severance of any connecting fibers of the material.

The engagement of the reëntrant angles of the cutting disks 14 and 15 with the material to be cut is sufficient to provide a feeding device by which the continuous strip 25 of material may be drawn from a coil, but tensions are applied to the strip 25 after it passes the cutting mechanism by means of the rolls 39 and 34 between which the side strips 27 pass, and this tension may be increased or decreased by the pressure exerted by the rolls 39 against the side strips, thereby increasing the grip of the rolls acting upon the side strips and the frictional resistance against slipping af-

forded by the friction bands 36. The pressure of the rolls 39 against the side strips 27 as they pass over the friction bands 36 is a yielding pressure exerted by a pair of spiral springs 50 interposed between the boxes 41 of the spindle 40 and a plate 51 sliding in the ways 42.

The plates 51 are adjusted by screws 52 having graduated heads 53 which are turned beneath fixed pointers 54 in order to engage the tension of the springs 50. By the adjustment of the springs 50 the tension upon the continuous strip as it is delivered by the cutting mechanism may be accurately and delicately adjusted and may be increased, if necessary, in order to produce a slight sliding movement of the continuous strip 25 as it passes through the cutting mechanism, the sliding movement of the strip occurring at such portions as a line of cleavage is parallel with the direction of its motion. By this adjustment of the tension I am able to cause an exact registration of the labels or, in other words, produce a definite number of labels for a given length of the continuous strip 25.

By separating the cutting and bed rolls by springs 6, I prevent any jumping action of the rolls as the interposed material runs out, and I am also able to maintain a very accurate adjustment between the peripheries of the cutting and bed rolls.

Power is imparted by means of a belt pulley 55 attached to a sleeve 56, journaled in a stud 57 held in the frame 1. The sleeve 56 carries a pinion 58 which engages a gear 59 on the spindle 9 of the cutting roll. The spindle 9 of the cutting roll is provided with a flanged belt pulley 60 having a belt connection with a flanged pulley 61 on the spindle 35, by which power is imparted to the separating roll 34.

I claim,

1. The combination with a cutting roll and a bed roll by which a longitudinal movement is imparted to a continuous strip of material to be cut, of a supporting plate for said strip leading to said cutting and bed rolls and substantially tangential thereto, said plate having side lips forming a guide for the strip.

2. The combination with a cutting roll and a bed roll, of a guide plate leading to said cutting and bed rolls and substantially tangential thereto, and a guide leading from said cutting and bed rolls substantially tangential to said cutting roll and at an angle to the plane of said first guide plate.

3. The combination with a cutting roll and a bed roll, of a guide for conducting a continuous strip of material to be cut to said rolls, a second guide in front of said rolls, and a connecting plate between said guides passing between said rolls.

4. The combination with a cutting roll and a bed roll, of an elastic yielding plate passing between said rolls and beneath the continuous strip of material to be cut, whereby said strip is held against said bed roll.

5. The combination with a cutting roll and a bed roll, of a guide, a separating mechanism for separating the severed strips, and an inclined guide between said cutting roll and said separating mechanism, said guide being tangential to said cutting roll, and at an angle to the line of feed to said cutting roll.

6. The combination with a rotary cutting mechanism capable of imparting a longitudinal movement to a continuous strip of material to be cut, of a guide in front of said cutting mechanism, and means for imparting a longitudinal tension to the continuous strip in said guide.

7. The combination with a cutting roll and a bed roll for acting upon a continuous strip of material, of means for applying a longitudinal tension to said strip as it leaves said rolls.

8. The combination with a cutting mechanism for acting upon a continuous strip of material in the direction of its length, of means for applying tension to said continuous strip while engaged by said cutting mechanism.

9. The combination with a bed roll having a plain cylindrical surface, of a cutting roll provided with two continuous peripheral cutting edges slightly separated from said bed roll but coöperating therewith to nearly sever a paper strip passing between said rolls, means for conducting a strip of paper to said rolls, and means for conducting a strip of paper from said rolls, said conducting means being in alinement and in a vertical plane at right angles with the axes of said rolls.

10. The combination with a cutting roll and a bed roll having their peripheries rotatable in adjacent circular paths but without pressure between them, of means for conducting a continuous strip of material to be cut to said rolls in a plane substantially tangential to the peripheries of said rolls and means for conducting the continuous strip from said cutting roll in a plane tangential to said cutting roll but at an angle to said first conducting means.

11. The combination with a cutting roll and a bed roll having their peripheries rotatable in adjacent circular paths but without pressure between them, of means for conducting a continuous strip of material to be cut, to said rolls in a plane substantially tangential to the peripheries of said rolls, means for conducting the continuous strip from said cutting roll in a plane tangential to said cutting roll but at an angle to said first conducting means, and means for im-

parting a longitudinal tension to the strip of paper as it passes between said rolls.

12. The combination of a bed roll and a coöperating roll having continuous peripheral cutting edges rotating out of contact with said bed roll, means for conducting a strip of material between said rolls, and means for increasing the speed of the strip of material, independently of the peripheral speed of said cutting edges.

13. The combination of a cutting mechanism for forming a multiplicity of strips from a single strip of material, means for imparting a longitudinal tension to the central strip, and means for imparting a combined longitudinal and transverse tension to the outer strip.

14. The combination of a cutting mechanism, means for imparting a longitudinal tension to a continuous strip as it leaves the cutting mechanism, and means for varying said tension.

15. In a cutting mechanism for acting upon a continuous strip of material to be cut in the direction of its length, means for imparting different longitudinal tensions to the different strips formed by the cutting mechanism.

16. The combination with a cutting mechanism for acting upon a continuous strip of material in the direction of its length, whereby longitudinal strips are formed, of a separating mechanism for separating said longitudinal strips, comprising means for imparting longitudinal tension to the central strip, and means for imparting a transverse tension in opposite directions to the outer side strips.

17. The combination with a cutting mechanism for acting upon a continuous strip in the direction of its length, whereby longitudinal strips are formed, of means for imparting a longitudinal tension to one of said strips, and means for imparting a tension transversely to its length to an adjacent strip, whereby said adjacent strip is moved sidewise to separate the strips.

18. The combination with a cutting mechanism for forming three longitudinal strips in a continuous strip of material, of a guide plate for supporting the central strip formed in said continuous strip, means for deflecting the side strips into a different plane, and wings projecting from said guide plate over which portions of said side strips are drawn by their deflection, thereby imparting a transverse movement thereto.

19. The combination of a mechanism for partially severing a continuous strip of material into a central strip and two outer side strips, means for imparting a longitudinal tension to said central strip independently of said side strips, and means for imparting tensions to said side strips to complete their thin separation from said central strip.

Dated this fourteenth day of April 1911.

MILTON H. BALLARD.

Witnesses:

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NELLIE WHALEN.