Nov. 12, 1929. P. M. O'NEILL ET AL 1,735,472

SPREADER FEED FOR PLASTIC STRIPS

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Fig. 1

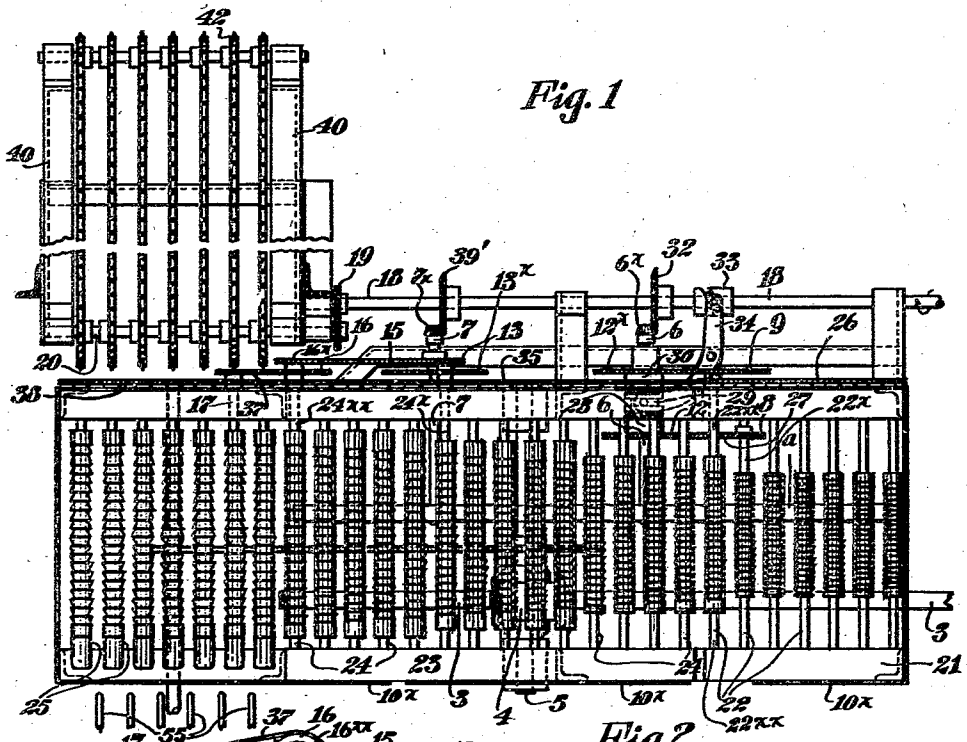
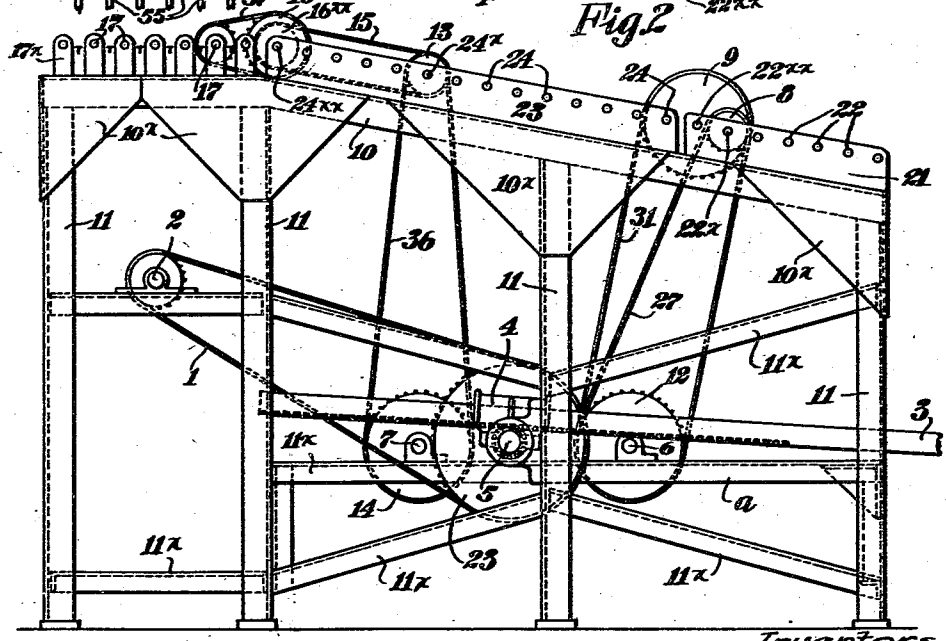


Fig. 2



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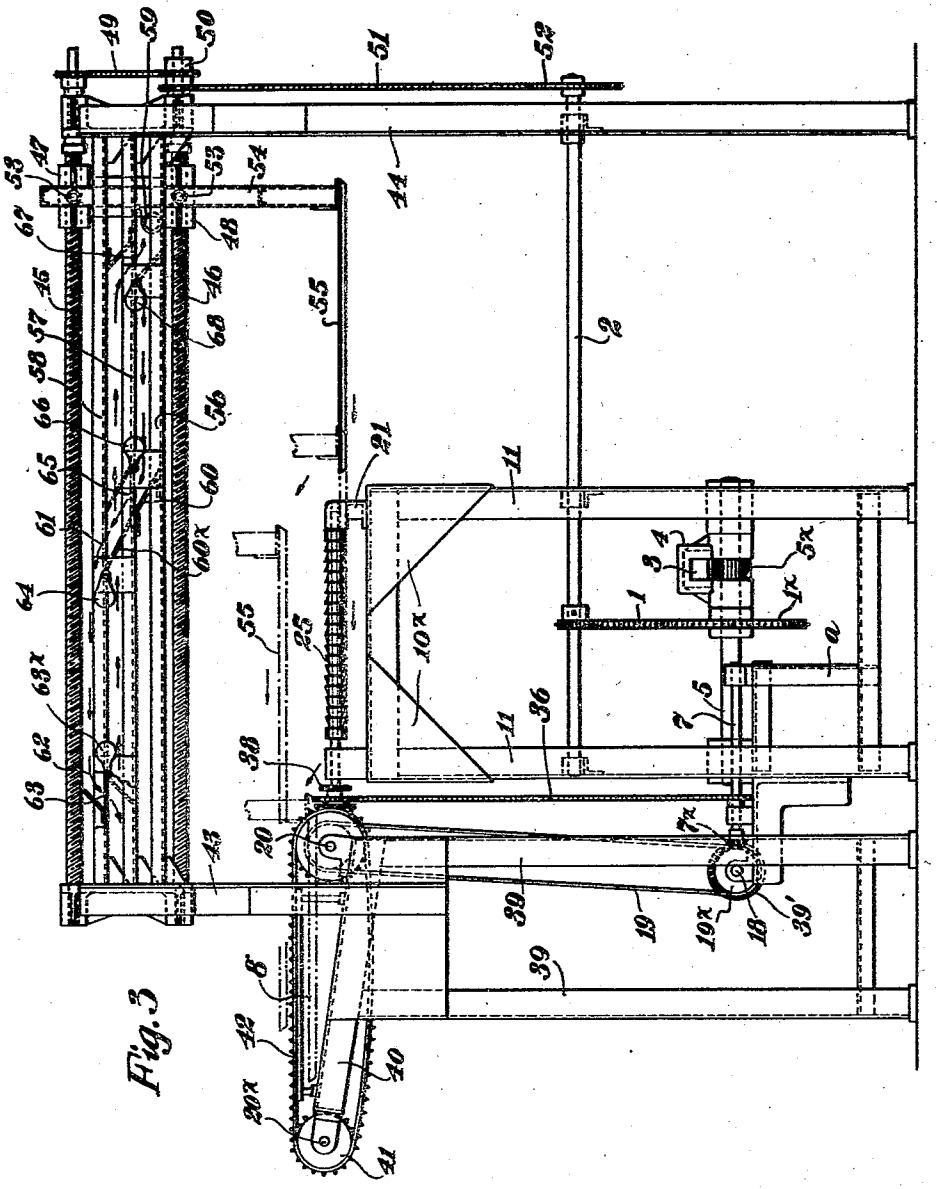


Fig. 3

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UNITED STATES PATENT OFFICE

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SPREADER FEED FOR PLASTIC STRIPS

Application filed April 25, 1928. Serial No. 272,842.

The object of the present invention is to provide means for receiving pencil-like lengths of plastics such as chicle compound and for separating and feeding them to a point where they may be cut in small units for further treatment, as for example coating with sugar in the manufacture of sugar or candy coated gum units. The invention is particularly designed for receiving the pencil-like strips cut from a thick sheet of gum compound while the pencils lie adjacent each other. The machine so acts that as the pencils are fed forwardly they gradually separate one from the other and finally pass to a point where, in parallel separated relationship, they are lifted and placed upon feeding belts which carry them to a point for further treatment.

The invention will be described with reference to the accompanying drawings, in which—

Figure 1 is a plan view of the invention;

Figure 2 is a side elevation of the same;

Figure 3 is an end elevation showing the machine having as an element lifting and conveying forks for transportating the pencils to a feed belt mechanism.

Referring to the drawings 10 represent upper longitudinal frame members, the said members being supported by the vertical frame members 11 and the braces 11^{x}. Further reinforcement may be afforded by the plates 10^{x}. Vertically projecting upon frame members 10 are opposed angle plates 21 supporting seven shafts, each shaft, lettered 22 in the drawings, being provided with a roller having twenty channels. To the left (Fig. 3) of the median line of each roller Fig. 3 the channels are so formed as to tend to cause the pencils received thereon to roll to the left. At the right of said median line the channels are so formed as to tend to cause the pencils to roll to the right. The channels of the successive rollers gradually increase in width so that the channels of the second roller are of greater width than the channels of the first roller. Thus by the time the end of the pencil reaches the seventh roller, the pencils are spread somewhat fan-shaped.

Supported by frame members 10 are opposed angle plates 23 which support fourteen shafts numbered 24 in the drawings. Each shaft supports a roller having formed therein twenty cam channels. The ten channels of each roller at the left of its median line are so formed as to tend to cause the pencils to roll to the left and the ten channels being so formed at the right of the median line as to tend to cause the pencils to roll to the right. Inasmuch as the channels of the said rollers carried by shafts 24 are gradually increased in width on the successive rollers, pencils leaving rollers on shaft 22 are further spread by the channeled rollers of shafts 24.

Supported by two sets of vertical bearing members 17^{x}, each set comprising seven members, are the seven shafts 17, each shaft carrying a roller and the seven rollers being indicated by the numeral 25 on the drawings. Each roller is formed with twenty cam channels and the ten channels at the left of the median line of each roller are so formed as to tend to cause the pencils to roll to the left, while at the right of the meidan line the ten channels are so formed as to tend to cause the pencils to roll to the right. When the pencils reach the rolls 25 they are not further spread but are carried forwardly in a straight line.

Each of the first seven shafts carries a sprocket wheel and all of the sprocket wheels are connected by a chain 26. Shaft 22^{x} of the group of shafts numbered 22 carries the sprocket wheel 8 engaged by a chain 27 driven by sprocket wheel 12, the latter being carried by shaft 6. Shaft 6 has attached thereto a clutch member 28 having a toothed face adapted to be engaged by a double-faced toothed clutch 29 splined on shaft 6, whereas

clutch member 28 with its gear 12 is loose on the shaft.

Clutch member 29 is also adapted to engage the toothed face of a clutch member 30 carrying a gear 12^{x} connected by chain 31 with sprocket wheel 9 on shaft 22^{xx} which is one of the shafts connected by sprocket wheels and chain 26 with the first seven shafts of group 22. Clutch member 30 and its sprocket wheel 12^{x} are loosely mounted on shaft 6. Shaft 6 is formed with a bevel pinion 6^{x} engaged by bevel gear 32 on shaft 18. Shaft 18 is the main drive shaft. It carries a cam 33, the spiral slot of which is engaged by a stud at the end of a clutch shift lever 34 suitably connected to clutch 29. Shaft 18 rotates at a constant speed and by means of the clutch shift shaft 6 alternately drives sprocket wheel 28 and sprocket wheel 30. Inasmuch as sprocket wheel 30 drives a large sprocket wheel 9 connected to shaft 22^{xx}, its rotation causes the first seven shafts 22 and their rollers to rotate at a relatively low speed. However, immediately upon the clutching of shaft 6 with sprocket wheel 12, the rollers are given a relatively high speed inasmuch as wheel 12 drives a small sprocket wheel 8. The first seven rollers therefore are driven first by a relatively low speed followed by a relatively high speed.

Each shaft 24 carries a sprocket wheel and the sprocket wheels of the first nine of the shafts 24 reading from the right of Fig. 1 are connected by a chain 35. Sprocket wheel 14 is connected by chain 36 with a sprocket wheel 13 on shaft 24^{x}, which shaft carries a second sprocket wheel 13^{x} (Fig. 1) connected by chain 15 with a sprocket wheel 16^{x} on shaft 24^{xx}.

Shaft 24^{xx} carries a second sprocket wheel 16 connected by a chain 37 to a sprocket wheel on shaft 17, the latter being one of the seven shafts carrying rollers 25. Each of the said seven shafts carries a sprocket wheel and the sprocket wheels are connected by a chain 38.

Shaft 7 carries a bevel pinion 7^{x} driven by bevel gear 39′ on main drive shaft 18.

By means of the above instrumentalities, the set of shafts 24 and the set of shafts 25 are driven as follows:—

Power from main shaft 18 is conveyed to shaft 7 by means of bevel gear 39′ and bevel pinion 7^{x}. Rotation of shaft 7 is imparted to sprocket wheel 13 by chain 36. The sprocket wheel 13 being on shaft 24^{x} and one of the shafts 24 interconnected by chain 35, the nine shafts so interconnected are rotated. The succeeding five shafts of series 24 are driven through the connection with shaft 24^{x} and shaft 24^{xx} by belt 15 and sprocket wheels 13^{x} and 16^{x}. Shaft 16^{x} being on shaft 24^{xx} and that shaft being connected by chain 37 to one of the shafts 17 and said shafts being interconnected by chain 38, the series of rollers 25 are given their movement. The arrangement is such that the rollers on shafts 24 and 25 rotate at the same speed, which speed is the second or high speed of the rollers on shafts 22.

Disposed at right angles to the said roller conveying mechanism is a belt conveying mechanism as follows:—

Supported by risers 39 and cross members 40 are shafts 20, 20^{x}. Each shaft carries seven sprocket wheels 41 and the opposed sprocket wheels are connected by belts 42, there thus being seven belts in spaced relationship. The top run of each belt may be supported by a horizontal stationary undersurfacing 42, Fig. 3. Shaft 20 carries a sprocket wheel driven by chain 19 which passes over a sprocket 19^{x} on shaft 18.

Overhanging the rollers 25 is a conveyor supported at one end by the standard 43 and at the opposite end by the standard 44. Between the two standards is journalled for rotation and upper screw 45 and a lower screw 46. Upon upper screw 45 is a nut 47 and upon screw 46 is a nut 48. Screw 45 is driven by a chain 49 leading to a sprocket 50 driven by a chain 51 leading to a sprocket 52, the latter being carried by shaft 2. The shaft 2 is driven by a sprocket connection with chain 1, the latter being carried over a sprocket 1^{x} on a shaft 5. Shaft 5 carries a pinion 5^{x} engaged by a reciprocatory rack bar 3 guided in a hook member 4. It will thus be seen that the reciprocations of the rack bar 3 cause a rotation of the screws first in one direction and then in the reverse direction. In such manner the screws 47 are caused to move forwardly and backward, that is to say first to the left of Fig. 3 and then to the right. Each screw is provided with a guide roller or guide rollers 53 engaging the walls of a U-shaped carrier bar 54, which at its lower end carries six spaced forks 55 indicated as to spaced relationship at the bottom of Fig. 1. Each fork is adapted to be carried intermediate two of the rollers 25 preliminary to lifting the pencils upwardly and onto belts 42.

Three trackways are provided intermediate the screws 45, 46, the first trackway being indicated at 56, the second at 57 and the third at 58. Carrier bar 54 is provided with a roller or rollers 59 which rest upon trackway 56 in the position of the parts illustrated in Fig. 3 In the operation of the device the screw will first move the sleeves to the left thus carrying the forks 55 under rollers 25 so that each fork is between two rollers. At this point roller 59 on trackway 56 will meet switch plate 60 and the screws in their continued rotation will cause carrier bar 54 to move upwardly in a direction of the arrows 61 and onto trackway 58 whereupon the forks will lie in the position shown in dotted lines 55, Figure 3. The carrier bar will continue to move to the left until the forks lie over belts 42. Roller 59 will thereafter come to

the position of the arrow 62, Fig. 3 and will meet there a weighted pivoted section 63 of trackway 58. Under the weight of the carrier bar and the forks, etc. roller 59 will move downward swinging the pivoted section 63 against the action of weight 63× and the roller will continue a downward movement until it meets a trackway 57. At this point the forks will have been carried to the dotted line position *g*, Fig. 3 and will have passed down below the upper surfaces of the belts depositing thereon the plastic pencils. At this point the screws will reverse their rotation.

Upon the reverse rotation of the screws carrier bar 54 will be moved to the right, the roller 59 being on trackway 57. As roller 59 meets weighted pivoted switch member 60× it will be caried upwardly against the action of weight 64 and the roller will pass over weighted switch section 65 which is maintained in position by weight 66. The roller will finally pass upon weighted switch section 67 and the carrier will overcome the weight 68 and will pass downwardly upon trackway 56 into the full line position shown in Fig. 3.

The device as above described provides an efficient and satisfactory means for feeding and separating plastic pencils without stretching or deforming them. The pencils are usually received in a warm and relatively soft condition so that they are capable of stretching and deformation by their own weight if not carefully supported. The twenty pencils pass forwardly upon rollers 22 and are gradually separated in slight-fan shaped formation. When the back ends of the twenty strips lie upon the foremost roller so that the strips are supported substantially throughout their lengths, cam members 33 acts upon throw-out lever 34 to throw in the fast driving mechanism previously described to rapidly move the twenty strips forwardly upon the series of rollers 24. These rollers will be driven at the same fast speed as that of the succeeding rollers, so that the pencils will then continue in their forward movement, being gradually spread apart by the cam grooves. As the pencils pass from the last roller 22, the said rollers commence their slow rotation to receive a second set of twenty pencils. In the meantime the first set of pencils is moving forward rapidly to be handled by the forked lifting mechanism above described. By such means successive sets of pencils are deposited by the forks upon the belts 42 and the worm mechanism is enabled to perform its reverse or idle movement whilst awaiting the passage to rollers 25 of a set of pencils.

It will be understood that various modifications may be made in the form and arrangement of the elements of the invention illustrated in the drawings without departing from the spirit of the invention, what we claim and desire to secure by Letters Patent being as follows:—

1. Feeding and separating means for plastic pencils comprising a plurality of rolls each having pencil receiving channels, and means for driving the said rolls, the channels of successive rolls being laterally offset, as and for the purpose set forth.

2. Feeding and separating means for plastic pencils comprising a plurality of rolls each having separate pencil receiving channels and means for driving said rolls, the channels of one roll being offset from the channels of a preceding roll, and the channels having inclined faces tending to cause the pencils to move by gravity longitudinally of the rolls, as and for the purpose set forth.

3. Feeding and separating means for plastic pencils comprising a plurality of rolls, each roll being formed with a plurality of separate pencil receiving channels at one side of its median line, the channels having walls inclined toward an end of the roll, and a plurality of separate channels opposite at the other side of said median line, the said channels having walls inclined toward the opposite end of the roll, as and for the purpose set forth.

4. Feeding and separating means for plastic pencils comprising a frame, a plurality of rolls supported in the frame, each roll having pencil receiving channels, the channels of the rolls being offset as to successive rolls, and means for driving said rolls at a uniform speed and for intermittently driving a plurality of said rolls at a higher speed.

5. Feeding and separating means for plastic pencils, comprising a frame, a plurality of rolls carried by said frame, each roll being formed with a plurality of pencil receiving channels, the channels of one roll being offset from the channels of a preceding roll, a conveyor for said pencils and adapted to transport them angularly of their movement on the rolls, and a forked carrier combined with means for actuating it to remove pencils from the roller and deposit the same on the conveyor.

6. Feeding and separating means for plastic pencils, comprising a frame, a plurality of rolls carried by said frame and a carrier adapted to lift pencils from the rolls and move the same angularly with respect to the direction of movement of the pencils on the rolls, said carrier comprising a screw, a nut and a carrier actuated by and movable vertically on the nut, in combination with a plurality of trackways and switch members adapted to act upon said carrier to cause its upward and downward movement upon the trackways in succession.

7. Feeding and separating means for plastic pencils, comprising a frame, a plurality of rolls carried by said frame and a carrier adapted to lift pencils from the rolls and

transport them angularly with respect to their movement on the rolls, said carrier comprising a plurality of forks, parallel screws, a nut on each screw, a fork supporting arm connected to each nut and vertically movable relatively thereto, a plurality of trackways intermediate the screws, and switches for said trackways, in combination with means for rotating the screws in opposite directions.

In testimony whereof we have signed our names to this specification.

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