April 22, 1930. H. G. NUTT ET AL 1,755,456

APPARATUS FOR MARKING FRUIT AND SIMILAR ARTICLES

Filed Oct. 31, 1928. 4 Sheets-Sheet 1

Fig. 1.

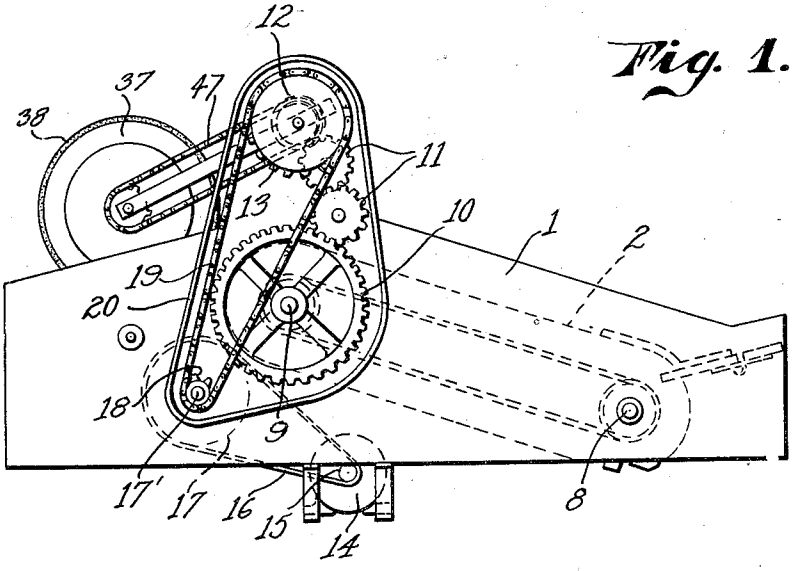
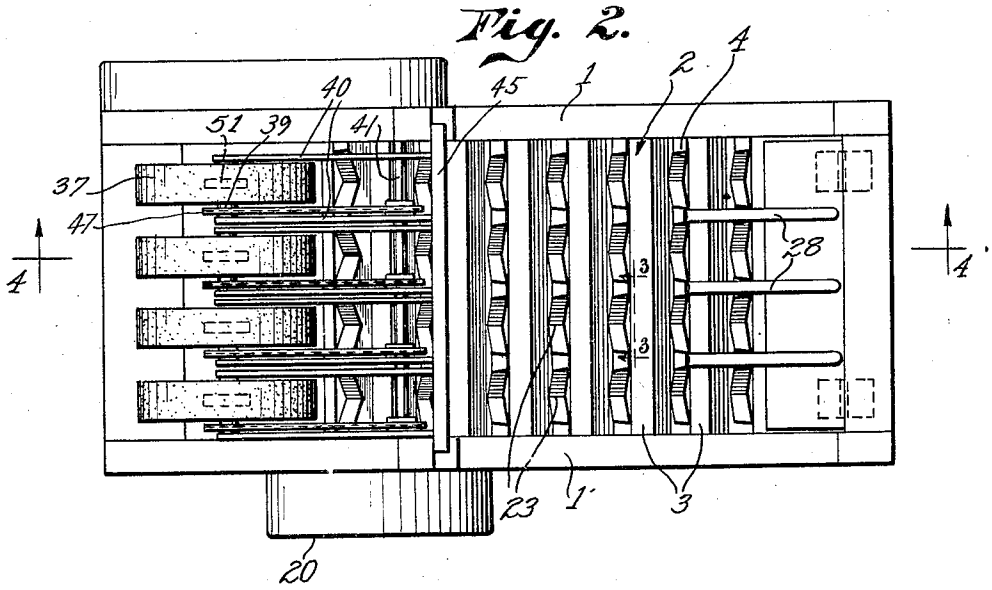


Fig. 2.



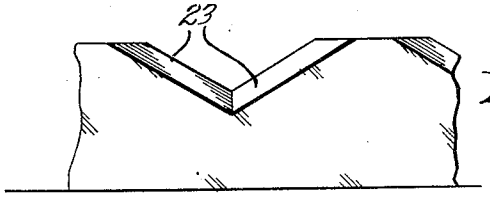


Fig. 3.

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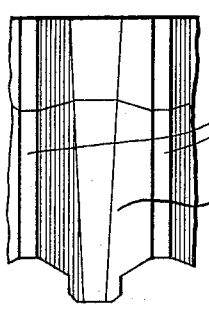


Fig. 5.

Fig. 4.

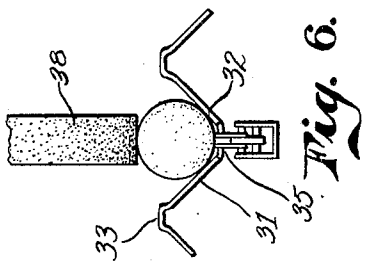


Fig. 6.

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Fig. 7.

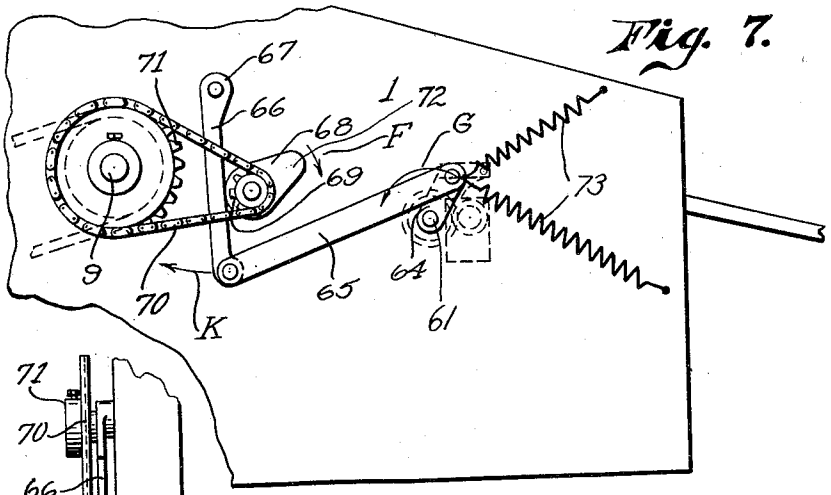


Fig. 8.

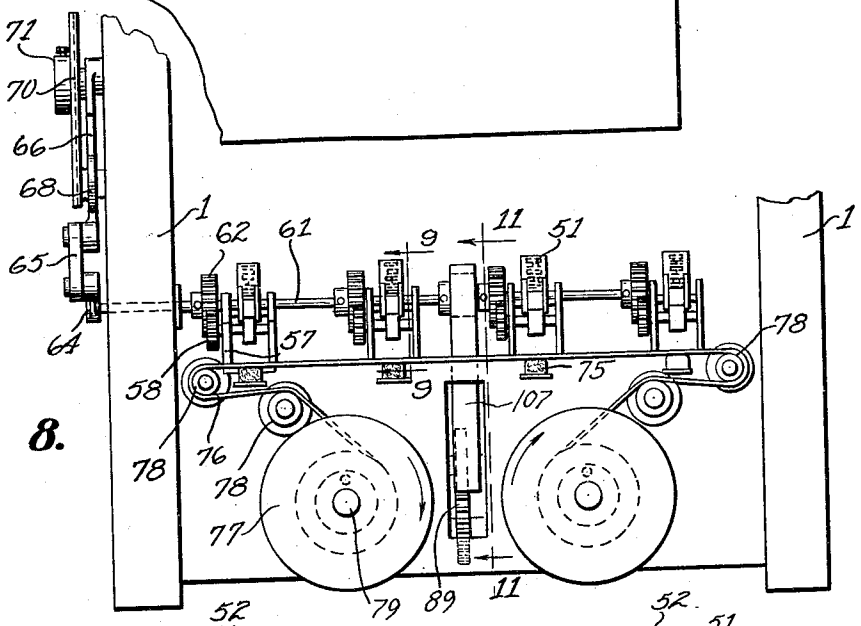


Fig. 9.

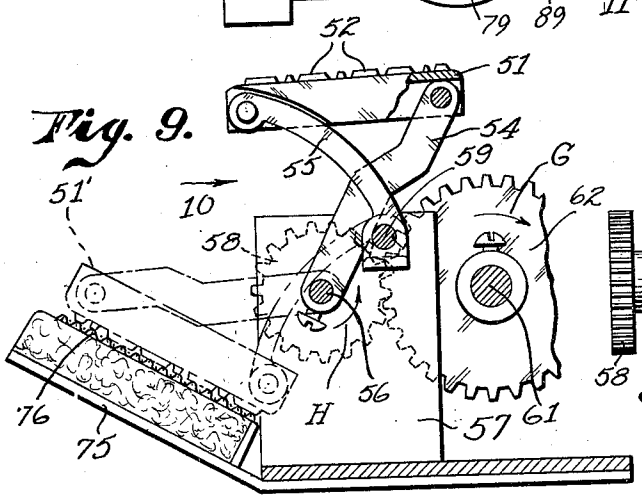
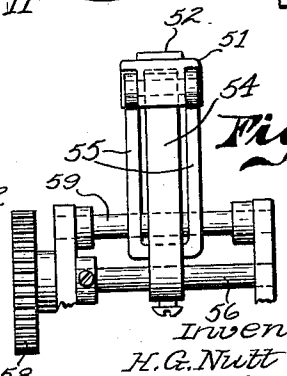


Fig. 10.



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APPARATUS FOR MARKING FRUIT AND SIMILAR ARTICLES

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Fig. 11.

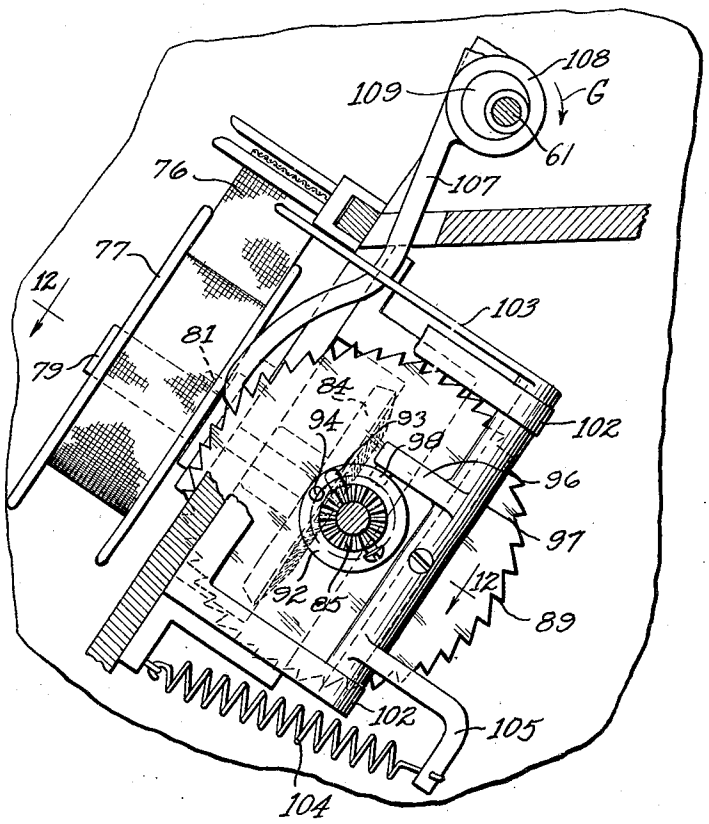
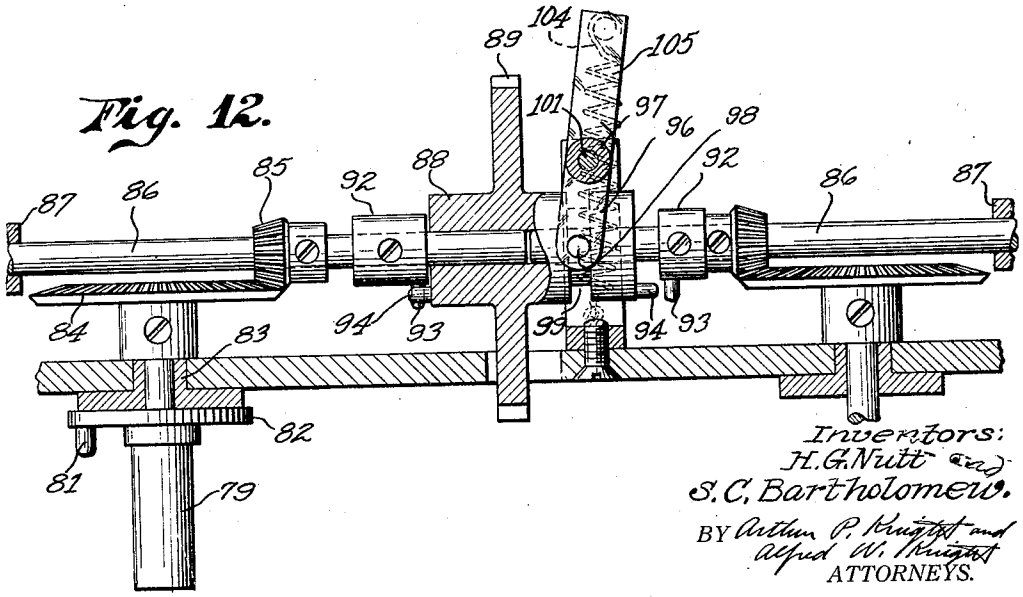


Fig. 12.



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Patented Apr. 22, 1930 1,755,456

UNITED STATES PATENT OFFICE

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APPARATUS FOR MARKING FRUIT AND SIMILAR ARTICLES

Application filed October 31, 1928. Serial No. 316,244.

This invention relates to apparatus for marking or printing suitable names or identifying marks on fruit and similar articles and particularly for marking oranges and other fruit whose shape is substantially spherical.

The main object of the invention is to provide an apparatus for this purpose which is simple and positive in operation, which will handle a large number of fruit in a given time, which will mark each fruit cleanly and distinctly with the desired name or mark, and in which the operation is entirely automatic.

A particular object of the invention is to provide novel means for inking the marking element.

Further objects of the invention are:

To provide a device in which the marking element is stationary during the marking operation and the fruit is rolled over and in direct contact with such marking element, the mark to be impressed upon the fruit.

To provide an apparatus having a single marking element for each column of fruit, and means for inking such marking element between successive passages of fruit thereover.

To provide novel means for automatically timing the inking operations with respect to the time of delivery of fruit to position to engage the marking element.

To provide marking means in which the impression of the mark upon the fruit is effected by direct contact of the fruit with the marking element, instead of printing through an inked ribbon as is frequently done, and to also provide novel means for inking the marking element by means of an inked ribbon between successive marking operations and for feeding the inked ribbon, so as to continually bring a fresh portion thereof into position for inking the marking element.

To provide a marking element mounted to swing or oscillate between marking position and inking position, and means synchronized with the feeding of fruit to marking position, for swinging such marking element from marking position to inking position and back again between successive deliveries of fruit to marking position.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate embodiments of our invention and referring thereto:

Fig. 1 is a side elevation of the apparatus with the front of the gear casing removed.

Fig. 2 is a plan view thereof.

Fig. 3 is a detailed view of one of the slats of the elevating means, showing one of the fruit receiving grooves thereon, said view being taken approximately on line 3—3 in Fig. 2.

Fig. 4 is a longitudinal vertical section of the apparatus taken on line 4—4 in Fig. 2.

Fig. 5 is a plan view of a portion of the guide means upon which the fruit is delivered to marking position, and is taken in the direction indicated by the arrow 5 in Fig. 4.

Fig. 6 is an end view of said guiding means and adjacent parts taken in the direction indicated by the arrow 6 in Fig. 4.

Fig. 7 is a partial side elevation taken from the reverse side of Fig. 1, with the gear case removed.

Fig. 8 is a view of the marking elements and inking means therefor taken on line 8—8 in Fig. 4, with the guiding means removed.

Fig. 9 is a section on line 9—9 in Fig. 8.

Fig. 10 is a front view of one of the marking elements and the operating means therefor taken in the direction indicated by the arrow 10 in Fig. 9.

Fig. 11 is a section on line 11—11 in Fig. 8.

Fig. 12 is a section on line 12—12 in Fig. 11.

The apparatus comprises side frame members 1 between which is mounted a slat elevator 2. Said elevator comprises alternate lifting or elevating slats 3 and guiding or spacing slats 4, which are mounted at their ends on chains 5 running over lower sprockets 6 and upper sprockets 7. The sprockets 6 are secured to shaft 8 which is rotatably mounted between the side frame members 1, and sprockets 7 are mounted upon shaft 9 which is also rotatably mounted in said frame members but which extends therethrough and is provided at one end with a gear wheel 10 which is driven through gears 11 from pinion 12 secured to sprocket 13, said sprocket be-

ing driven at suitable speed by means of electric motor 14, whose shaft 14′ is operatively connected thereto by means of pulley 15, belt 16, pulley 17, shaft 17′, sprocket 18 and chain 19. A gear case 20 may be provided for enclosing the several gears and sprockets of the above described driving mechanism, as shown in Fig. 1.

Each elevating slat 3 is formed with a ridge 21 extending longitudinally of said slat and transversely to the direction of motion of the elevator, so as to provide a lifting surface 22, upon which the fruit is adapted to rest. Each slat 4, on the other hand, is provided with a plurality of V-shaped notches 23 equally spaced at suitable intervals across the length thereof and transversely to the motion of the elevator, so as to properly space or guide the fruit. These spacing notches are shown as being so formed that the bottoms thereof are inclined upwardly in the direction of travel of the elevator so that as each slat 4 reaches the position in which the fruit is discharged therefrom, due to tilting of such slat in passing over the upper sprocket 7, the bottoms of the several notches 23, as indicated at 24 in Fig. 4, have substantially the same inclination as the guide means hereinafter described into which such fruit is so delivered. By means of this arrangement the discharge of the fruit is retarded until the respective slats 4 reach a position substantially in line with the guide means, and each fruit is caused to roll smoothly and at definite uniform velocity from the elevator onto said guide means for the purpose hereinafter described.

The fruit may be fed onto the lower end of the elevator by means of a feeding apron 25 whose lower end portion 26 is hinged as at 27 and is adapted to rest upon the several slats 3 and 4 and to be raised by each of said slats as it passes thereunder. Upon said hinged portion 26 are mounted a plurality of guiding or distributing bars 28 which are equally spaced between adjacent notches 23 so as to assist in the distribution of fruit into said notches.

Suitable means are provided for receiving fruit from the upper end of the elevator 2 and guiding the same into position to engage the marking elements. Such means may comprise a stationary guiding plate 31 inclined slightly downwardly in the direction of travel of the fruit and provided with corrugations defining a plurality of guiding channels or runways 32 separated by ridges 33. The several channels 32 are arranged in line with the several sets of guiding notches 23 in the elevator slats 4. Beyond the end of each guiding channel 32 is provided an opening 35 in which the marking element is presented to engage the fruit in its passage from said channel. A downwardly inclined board 36 may be provided for carrying away the marked fruit.

Above the several guiding channels 32 are provided a plurality of mechanically driven feeding rollers 37, each preferably provided with a layer 38 of rubber or other resilient material about its periphery. Each of said rollers is mounted upon a shaft 39 rotatably mounted between the ends of the two arms 40 of a swinging yoke. Said arms 40 are mounted to swing vertically and independently about a shaft 41 extending between upwardly projecting portions 42 of side frame members 1. Each pair of said arms may be connected at their upper ends by a cross bar 43, upon which is mounted a stop member 44 adapted to engage a stop bar 45 secured to the frame, so as to limit the swinging movement of arms 40 and prevent the rollers 37 from striking or approaching too closely the guiding means 31. A sprocket 46 may be secured to each roller 37 and connected by driving chain 47 to a sprocket 48, the several sprockets 48 being secured to shaft 41, and said shaft is shown as being driven by means of the above mentioned sprocket 13 mounted thereon at one end.

Beneath each of the marking openings 35 is mounted a marking element 51 provided with suitable type of marking members 52 representing the letters or characters to be printed upon the fruit. Each of such marking elements is mounted to provide for oscillating or swinging movement thereof between a position within the opening 35 and in line with or slightly above the bottom of the corresponding guiding channel 32, and a position of engagement with suitable inking means. For this purpose each marking element 51 may be mounted upon arms 54 and 55 pivotally secured adjacent the rear and forward ends thereof respectively, and in order to provide greater stability and smoothness of operation we prefer to provide two of the arms 55, one at each side of arm 54. Arm 54 is secured to shaft 56 which is rotatably mounted in supporting brackets 57 and provided at one end with gear wheel 58. The arms 55 are connected by shaft 59 which is also rotatably mounted in said brackets. Each marking element and its actuating means, including arms 54 and 55, shafts 56 and 59, gear wheel 58, and supporting brackets 57, constitute an independent marking unit. A shaft 61 is rotatably mounted in suitable bearing means in the side frame members 1 and gear wheels 62 are secured to said shaft in position to mesh with the gear wheels 58 of the respective marking unit. The construction is, therefore, such that each marking unit may be independently removed and replaced without disturbing the main shaft 61 which serves to operate all of said units.

The shaft 61 extends through the frame

at one end and is provided with an arm 64 connected by link 65 to arm 66 which is pivoted as at 67 on the frame member 1. A cam member 68 is rotatably mounted on the side frame member 1 and is provided with a sprocket 69 connected by chain 70 to a sprocket 71 on the shaft 9 aforesaid. Sprockets 69 and 71 are so proportioned that the cam member 68 is given one revolution for each passage of a pair of slats 3 and 4 into position to discharge fruit onto the guiding means 31. Cam member 68 has a projection 72 which engages arm 66 upon rotation of said cam, to force said arm in the direction indicated by the arrow K in Fig. 7. Springs 73 may be secured to the upper end of arm 64, so as to tend to hold said arm and arm 66 in the position shown in Fig. 7. When the parts are in this position the arm 54 of each marking unit rests against the corresponding shaft 59 as a stop.

A pad 75 of rubber, felt or other suitable material is mounted in front of and somewhat below each of the marking elements 51 and at such an inclination that the respective marking elements may be moved by means of arms 54 and 55 into a position upon the upper face of said pads as shown in dotted lines at 51′ in Fig. 9. Suitable means are provided for moving an inking ribbon over the upper faces of said pads 75 so as to be engaged between the marking element 51 when in said last named position and the corresponding pad 75. The inking ribbon 76, which may consist of an ink-bearing ribbon of cloth, paper or other suitable medium, may be mounted upon winding spools 77, and suitable guiding rollers 78 may be provided for causing such ribbon to pass over the pads 75 as stated. The respective spools 77 may be removably mounted upon shafts 79 at the respective sides of the apparatus and each of said spools may be caused to rotate with the corresponding shaft by means of a pin 81 on collar 82 secured to said shaft, engaging a suitable opening in the side of the spool. Each shaft 79 may be rotatably mounted in bearing means 82 and may be provided with a bevel gear 84 meshing with a bevel gear 85 on a shaft 86. Each of the shafts 86 is rotatably mounted at its outer end in bearing means 87 while both of said shafts project at their inner ends into a hub portion 88 of ratchet wheel 89. The hub portion 88 is sufficiently extended lengthwise of said shafts to provide a firm bearing for the inner ends thereof and maintain the shafts in proper alignment while permitting either of said shafts to rotate independently of the other.

A collar 92 may be secured to each shaft 86 and provided with a pin 93 projecting radially therefrom. The space between collars 92 is somewhat greater than the length of hub member 88, so as to permit movement of said hub member longitudinally of the shafts 86, and said hub member is provided with a pin 94 at each end thereof adapted to engage the pin 93 on the adjacent collar when said hub member is moved toward said collar. In order to move the hub member 88 so as to engage either one or the other of the pins 93, an arm 96 on sleeve 97 may be provided with a pin 98 engaging groove 99 in said hub member. Said sleeve member is secured to shaft 101 which is rotatably mounted in bearing supports 102, and an arm 103 may be secured to the upper end of said shaft and may extend into a suitable position to permit manual operation thereof, so as to throw the hub member 88 to one side or the other. A tension spring 104 may be connected to arm 105 on sleeve 97, so as to hold said hub member in either position to which it is moved.

The ratchet wheel 89 may be operated by means of pawl member 107 provided at its upper end with a strap 108 engaging eccentric 109 on the shaft 61 above mentioned, the weight of said pawl member serving to hold it in engagement with the teeth of ratchet wheel 89.

The operation of the above described marking apparatus is as follows: With motor 14 in operation the elevator 2 is driven in the direction indicated by the arrow A in Fig. 4 and the fruit is fed onto the feeding apron 25 and delivered over the hinged portion 26 into the spaces provided by the respective lifting slats 3 and the notches 23 on the spacing slats 4, as indicated at B in Fig. 4. As each of the slats 3 and 4 passes underneath the hinged portion 46 of the feeding apron, such hinged portion, together with the bars 28 carried thereby, is raised and then permitted to fall, the resulting oscillatory movement of the said hinged portion and bars assisting in the uniform distribution of fruit in all of the notches 23 of each spacing slat.

The fruit so deposited in the elevator is raised thereby, each spacing slat discharging the fruit carried thereby onto the guiding means 31, when said spacing slat is substantially in the position shown at C in Fig. 4, and since the inclination of the bottom of the several notches 23 is at that time substantially the same as that of the guiding means, the fruit is permitted to roll smoothly and at a definite velocity from the elevator onto said guiding means. The delivery of each fruit to the guiding means at substantially a fixed velocity is important to the satisfactory operation of the apparatus as it provides the proper time interval between the time of delivery from the elevator and the time of passage over the marking means.

The fruit then rolls in the channels 32 of the guiding means and upon reaching the position indicated at D in Fig. 4 each fruit

engages the corresponding feeding roller 37 which is rotated at a definite velocity by means of chain 47. The pivotally mounted arms 40 permit each feeding roller 37 to be raised sufficiently for passage of the fruit thereunder, and also permit the feeding rollers to gravitably engage the fruit to roll it over the marking means, and the fact that each feeding roller swings separately provides for satisfactory handling of fruits differing somewhat as to size in the respective guide channels 32, it being understood that while each apparatus such as that shown will in general be supplied only with fruit falling within a certain range of sizes, yet there will be more or less variation as to size within this range. The fruit is then carried by the feeding roller 37 out of the guiding channel 32 and over the corresponding marking element 51 whose inked type impress upon the surface of the fruit the desired letters or identifying characters, it being noted that the marking element is held stationary at this time and the fruit is rolled thereover by the feeding roller 37. The marked fruit then passes onto the board 36 and may be delivered thereby to any suitable position for further disposition. The fruit is, therefore, fed through the apparatus in one or more columns, the fruit in each column being first elevated, then guided at definite velocity to the marking means, and finally marked, separately from the fruit in the other columns.

As each fruit starts down the guiding means 31 at a definite velocity and is then engaged by the pivotally mounted feeding roller 37 and carried thereby at definite velocity over the marking element it will be apparent that the time interval, between the delivery of a fruit from the elevator until such fruit passes out of contact with the marking element, is substantially constant. The cam member 68 is rotated in the direction indicated by the arrow F in Fig. 7 and the projection 72 of said cam member is so positioned that after the lapse of the above mentioned interval for passage of a fruit over the marking element, said projection will engage arm 66 and will operate through said arm, link 65 and arm 64 to rotate shaft 61 in the direction indicated by the arrows G in Figs. 7 and 8. Such shaft in turn operates through gear wheels 62 and the respective gear wheels 58 to rotate the shafts 56 of the individual marking elements in the direction indicated by the arrow H in Fig. 9, so as to swing the marking elements into a position of contact with the inking ribbon 76, as indicated at 51′ in Fig. 9. The type 52 thus receives a fresh amount of ink and upon further movement of cam 68 the projection 72 passes out of engagement with arm 68, and shafts 61 and 56 are returned to their former positions by springs 73, thus returning each marking element 51 to its marking position and against the corresponding shaft 59 as a stop. The rapidity of movement of the marking elements 51 from marking position to inking position and back again is sufficient to permit each marking element to be inked and returned between successive passages of fruit thereover, and a single marking element is thus required for each column of fruit passed through the apparatus.

Upon each movement of shaft 61 in the direction indicated at G (see Fig. 11), the eccentric 109 and strap 108 operate to lift the pawl member 107 and move it backward over the teeth on ratchet wheel 89. The subsequent return movement of said shaft, over the action of springs 73, operates through said eccentric and strap to force said pawl member downwardly and cause rotation of ratchet wheel 89, and said ratchet wheel operates through engagement with one or the other of the collars 92 to rotate the corresponding shaft 79 and the winding spool 77 carried thereby, so as to wind the inking ribbon 76 from one spool to the other. Each operation of the marking means, therefore, operates to move a fresh portion of the inking ribbon into position for engagement with the marking element so that each time the marking element is lowered to inking position it is brought into engagement with a fresh portion of the ribbon, thus insuring perfect inking of the marking element. If desired, the direction of feed of the inking ribbon may be reversed by manual operation of arm 103, so as to throw the hub member 88 of ratchet wheel 89 to the other side of the dead center position of spring 104, so as to engage the other collar 92.

We claim:

1. An apparatus for marking fruit comprising guiding means and means for causing fruit to pass in a plurality of columns over said guiding means, a single marking element for each such column of fruit, and means for moving each marking element from marking position to inking position and back again between passages of successive fruit in the corresponding column into position of engagement with said marking element.

2. An apparatus for marking fruit comprising downwardly inclined guide means, means for delivering fruit at definite intervals and at substantially uniform velocity to the upper end of said guide means, a marking element mounted to oscillate between a marking position for engagement with fruit leaving said guide means and an inking position, means for inking said marking element upon movement thereof to inking position, and means operated in synchronism with the means delivering fruit to the upper end of said guide means to move said marking element from marking position to inking position and back again between successive passages of fruit in contact therewith.

3. An apparatus as set forth in claim 2 and comprising in addition feeding means gravitally engaging the fruit in its passage through said guide means and operable to roll said fruit over said marking element.

4. In an apparatus for marking fruit a plurality of marking units each comprising a marking element, a shaft, a gear wheel on said shaft and means operatively connecting said shaft to said marking element to cause said marking element to oscillate between a marking position and an inking position upon oscillation of said shaft, a main shaft provided with a plurality of gear wheels meshing with said gear wheels of the respective marking units so as to permit independent removal and replacement of the individual marking units.

5. In an apparatus for marking fruit, downwardly inclined guide means, marking means in position to engage fruit delivered from the lower end of said guide means, and elevating means for delivering fruit to the upper end of said guide means, said elevating means being provided with alternate lifting and spacing slats, said lifting slats having means engaging the fruit to lift the same therewith, and said spacing slats having spaced recesses whose bottoms are inclined upwardly in the direction of travel of the elevating means so as to retard the delivery of fruit from the upper end thereof until the bottoms of said recesses are substantially in line with the upper portion of said guide means.

In testimony whereof we have hereunto subscribed our names.

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