

Oct. 23, 1945.

C. K. DUNLAP ET AL

2,387,248

CONE MARKING MACHINE AND METHOD

Filed Nov. 28, 1942

5 Sheets-Sheet 1

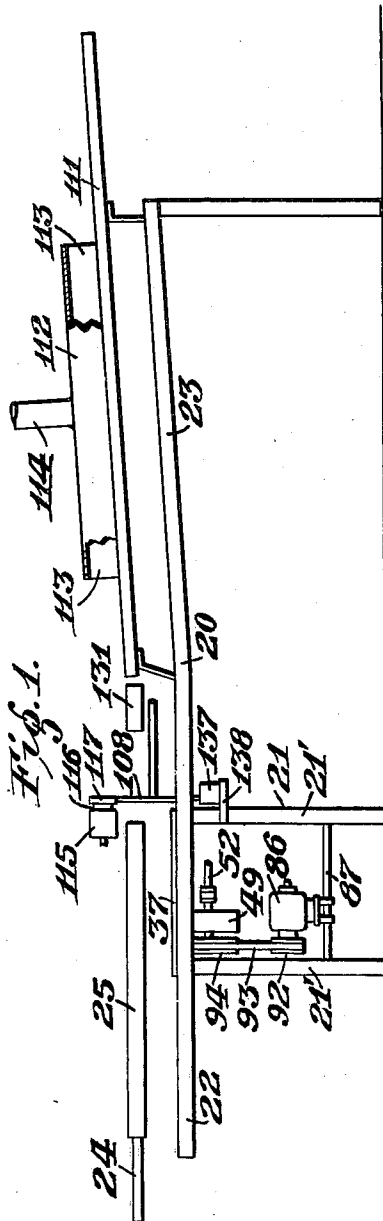
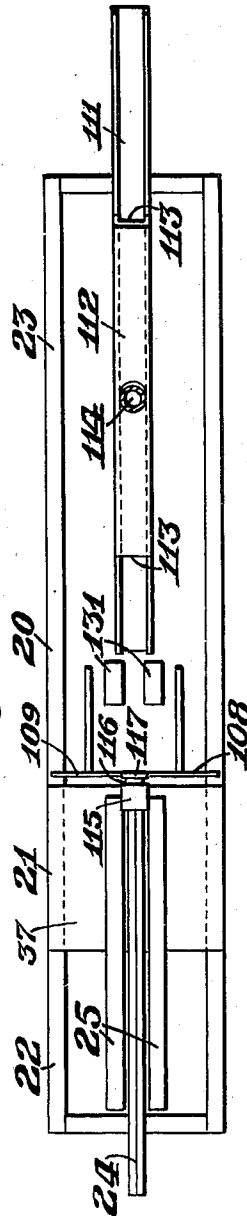
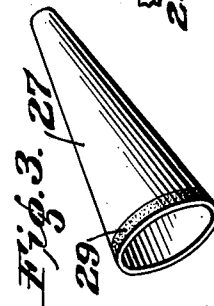
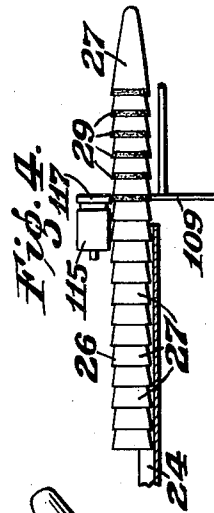
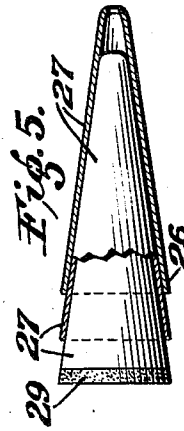


Fig. 2.



Inventors:

Charles K. Dunlap,
Lawrence B. Stogner,
Warley L. Parrott
their Attorney.

Oct. 23, 1945.

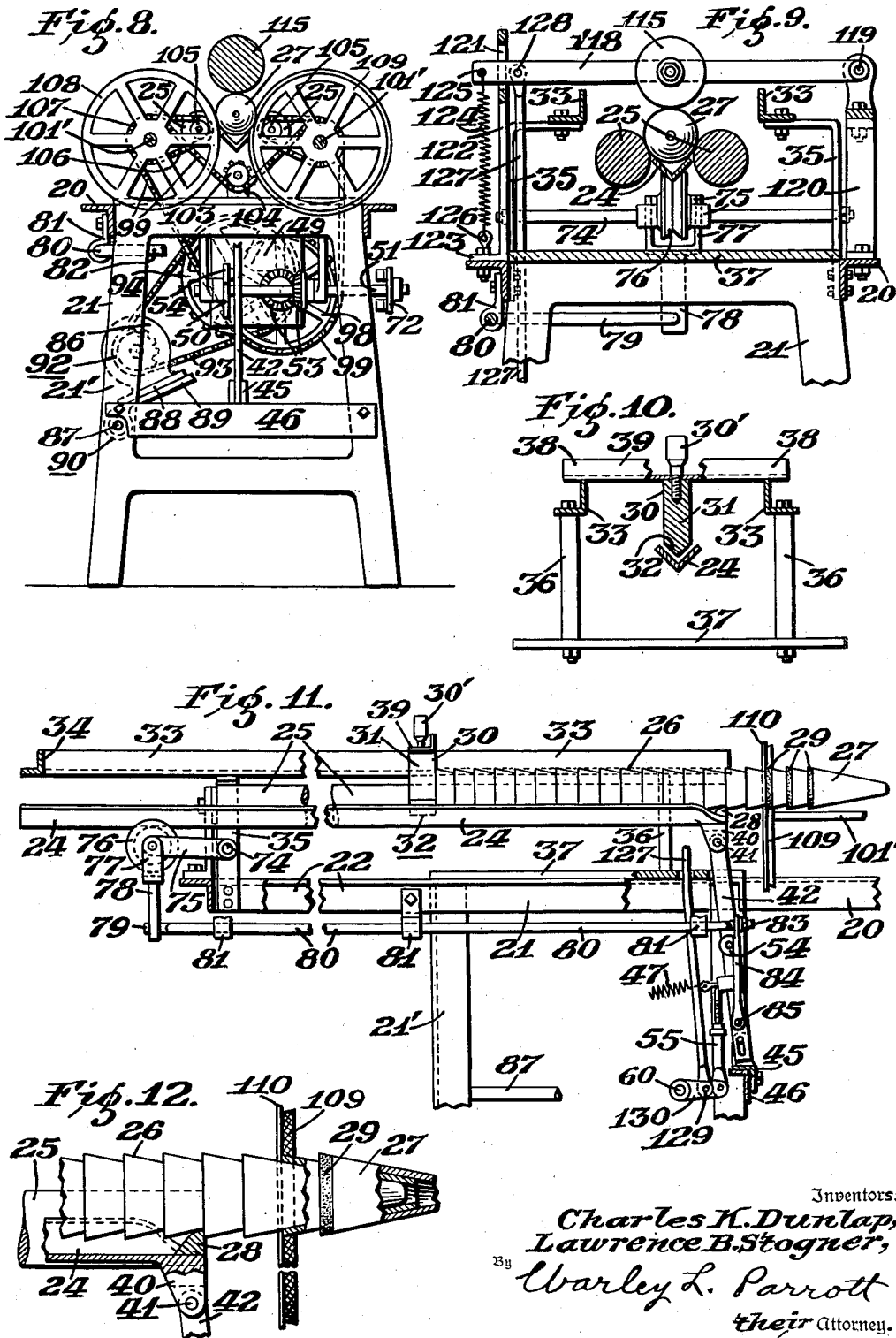
C. K. DUNLAP ET AL

2,387,248

CONE MARKING MACHINE AND METHOD

Filed Nov. 28, 1942

5 Sheets-Sheet 3



Inventors:
Charles K. Dunlap,
Lawrence B. Stogner,
Warley L. Parrott
their Attorney.

Oct. 23, 1945.

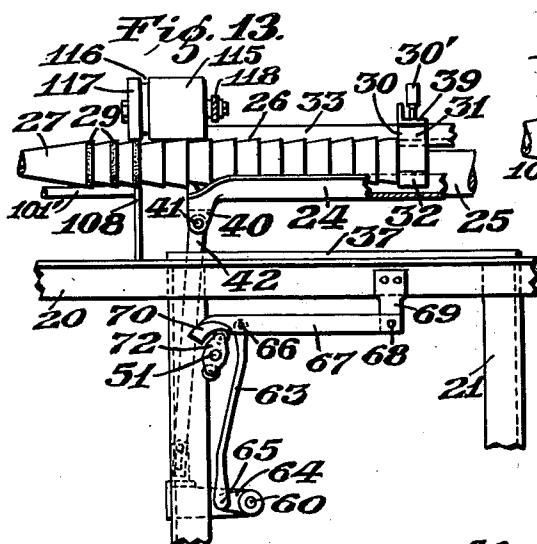
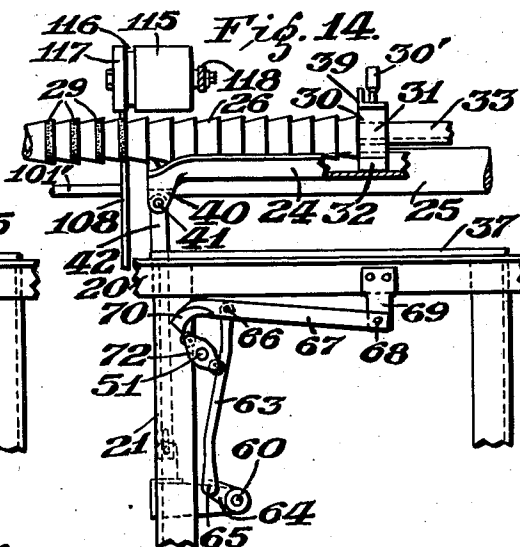
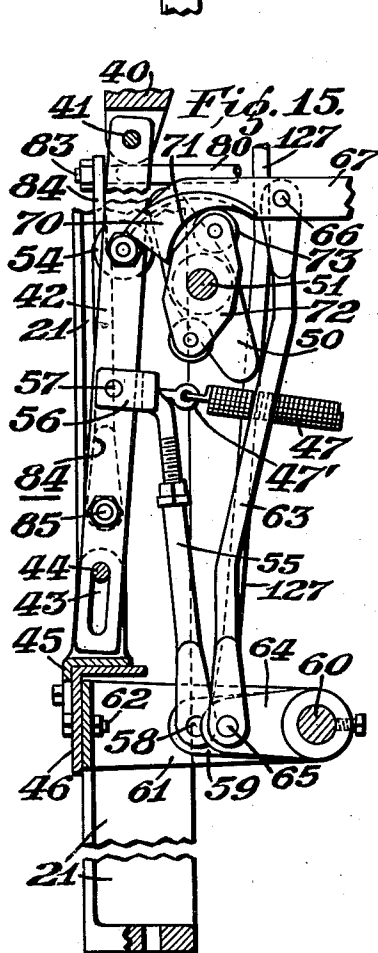
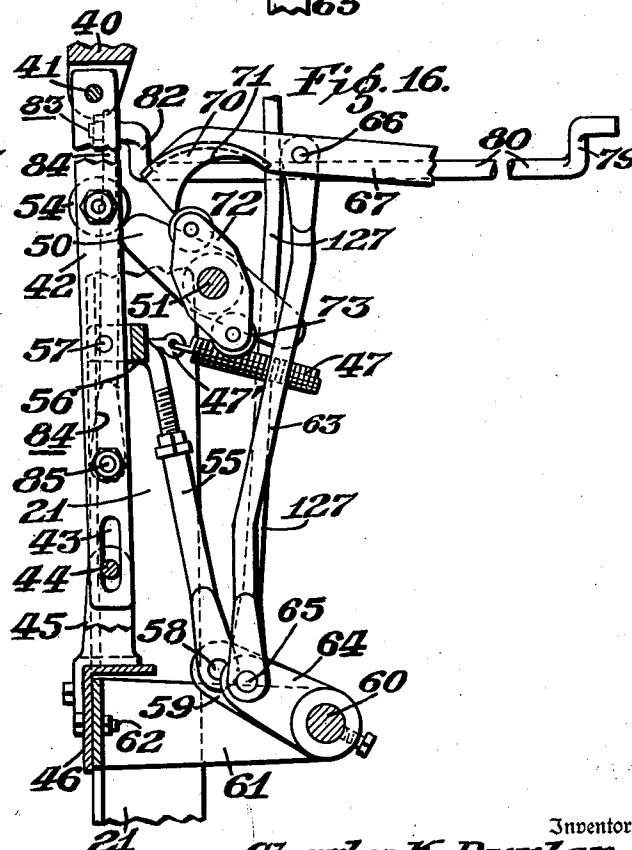
C. K. DUNLAP ET AL

2,387,248

CONE MARKING MACHINE AND METHOD

Filed Nov. 28, 1942

5 Sheets-Sheet 4



Inventors:

Charles K. Dunlap,
Lawrence B. Stogner,
Warley L. Parrott

their Attorney.

Oct. 23, 1945.

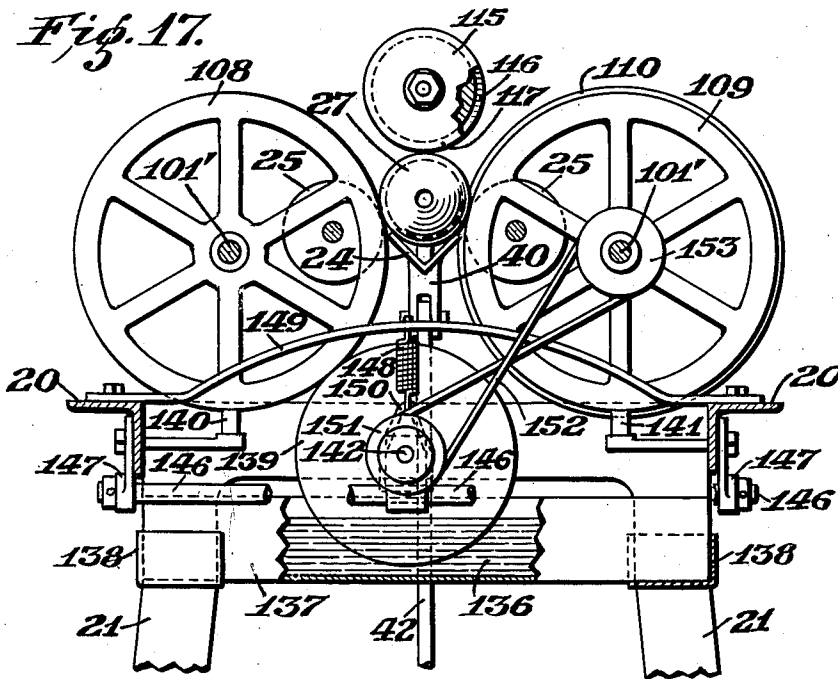
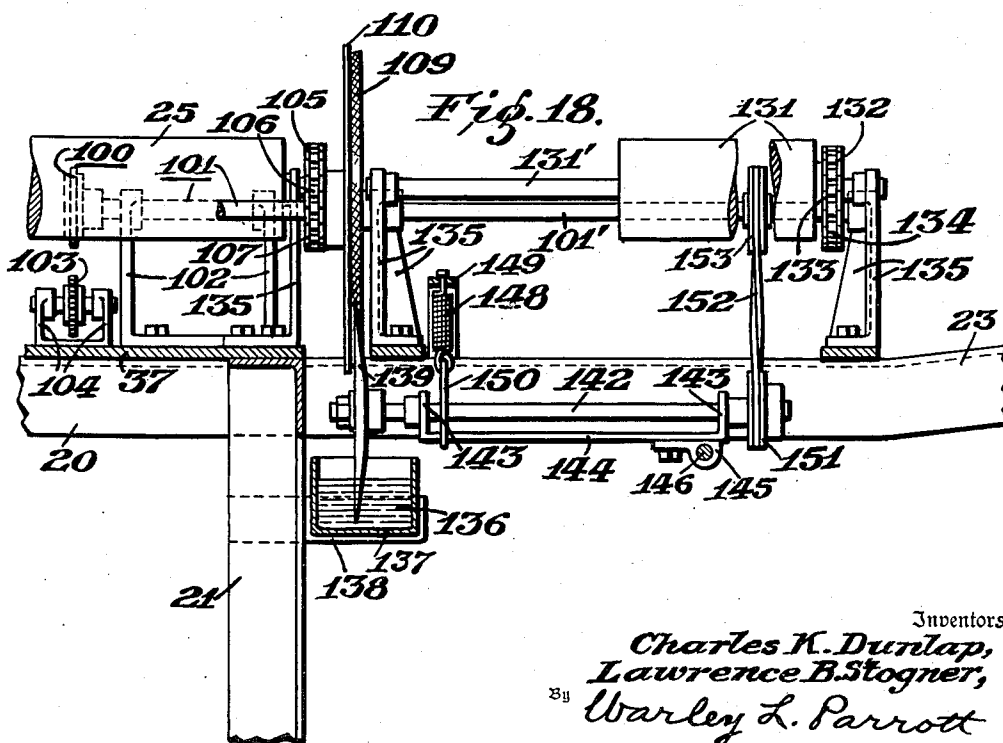
C. K. DUNLAP ET AL

2,387,248

CONE MARKING MACHINE AND METHOD

Filed Nov. 28, 1942

5 Sheets-Sheet 5



Inventors:

*Charles K. Dunlap,
Lawrence B. Stogner,*

By

Warley L. Parrott

their Attorney.

UNITED STATES PATENT OFFICE

2,387,248

CONE MARKING MACHINE AND METHOD

Charles K. Dunlap and Lawrence B. Stogner,
Hartsville, S. C., assignors to Sonoco Products
Company, a corporation of South Carolina

Application November 28, 1942, Serial No. 467,250

16 Claims. (Cl. 117-44)

Our invention relates to machines for marking cones, more particularly the hollow conical shells usually made of wound paper stock or similar fibrous material or pulp. These cones are generally used in the textile industry as spools or bobbins on which the knitting and weaving thread or yarn is wound and taken therefrom when placed in the looms and knitting machines to produce the fabric.

In practice the respective cones are usually marked at their bases, each with a relatively narrow, annular band of a distinctive color indicative of the particular type of the thread or yarn to be wound and carried on the cone.

The present invention has to do with the marking of the cones as generally stated above. However, in its more specific purport, it is concerned with a machine of simplified construction, yet positive in action and of high efficiency in the feeding and travel of the cones and application of the marking material to the cones.

The general broad features of the machine, as well as its more specific structure, will appear in the following description in connection with the accompanying illustrative drawings, in which:

Fig. 1 is a generally schematic view, in side elevation and with certain structural details omitted, but showing the relative form and arrangement of the principal cooperative elements of the machine;

Fig. 2 is a top plan view of the machine as shown in Fig. 1;

Fig. 3 is a detail perspective view of a conventional, hollow cone;

Fig. 4 is a view, on a smaller scale and more or less schematic in character, illustrating a stick of nested cones, with one of the marking wheels and the presser roller of the machine in their cooperative relation for the marking of a cone in the stick;

Fig. 5 is a fragmentary view in partial longitudinal section and side elevation and on an enlarged scale, showing in clearer detail the nesting of the cones in a stick;

Fig. 6 is a fragmentary view, in partial longitudinal section and elevation, of the middle portion of the machine, with parts of the power driving mechanism removed to show more clearly the correlation of cone-marking elements and adjacent portions of the cone-feeding means in the region of the marking means;

Fig. 7 is a top plan view of that portion of the machine shown in Fig. 6;

Fig. 8 is a vertical cross section of the machine

at a place just beyond the marking means, showing parts of the main driving means;

Fig. 9 is a fragmentary view, on a larger scale and in cross section just ahead of the marking means, showing more clearly the relative arrangement of the cone-carrying trough, feeder rolls and presser roller, together with the supporting and controlling means for the presser roller and parts of the supporting and actuating means for the cone-carrying trough;

Fig. 10 is a fragmentary view, in partial cross section and elevation, illustrating the pusher element for the cones on the cone-carrying trough;

Fig. 11 is a fragmentary view, in partial longitudinal section and elevation, illustrating more particularly the cone-carrying trough and its supporting and actuating means;

Fig. 12 is a fragmentary view, on an enlarged scale, showing more clearly the positive cone-feeding lug of the cone-carrying trough;

Fig. 13 is a fragmentary view, in side elevation and partial longitudinal section, illustrating the main lifting and lowering elements for the cone-carrying trough in their relative positions when the trough is in its normal lowermost position;

Fig. 14 is a view similar to that of Fig. 13, but showing the relative positions of the parts when the cone-carrying trough is in its raised position;

Fig. 15 is a fragmentary view, on a greatly enlarged scale, showing the details of the lifting, forwardly feeding, lowering and returning mechanism of the cone-carrying trough, together with the correlated lifting and lowering control of the presser roller, the several parts being in their relative positions when the cone-carrying trough and the presser roller are in lowered position;

Fig. 16 is a view of the parts shown in Fig. 15, but at the time the cone-carrying trough and the presser roller are in raised position;

Fig. 17 is a partial cross sectional and elevational view, on a somewhat enlarged scale, showing more particularly the pan or container for the liquid marking material and the means for transferring the marking material and applying it to one of the marking wheels which, together with the companion wheel, applies the marking material to the interposed cone; and

Fig. 18 is a partial longitudinal section and elevation of the cooperative parts shown in Fig. 17.

Referring now to the drawings in detail and, first, more generally as to the principal cooperative elements that enter directly into the handling and marking of the cones, the numeral 20 designates, generally, the main frame of the machine. As shown, this frame comprises a mid-

dle stand 21, carrying the main driving and controlling mechanism and having at the front end thereof a horizontal lead-in extension 22 that supports the cone carrier and feeder elements.

At the rear end of the middle frame section or stand 21, is an upwardly inclined extension 23 supporting the elements that carry the marked cones from the marking elements and deliver the cones from the machine.

The cone carrying and feeding means includes a trough 24 which is preferably V-shape in cross section. This trough 24 is disposed between a pair of parallel rolls 25 in close proximity thereto. The rolls 25 are continuously rotated in the same direction, while the interposed trough 24 is given an intermittent actuation which is rotary and longitudinally between the pair of rolls 25. That is to say, the trough, in its actuation and although substantially horizontal at all times, is lifted from a normal lowermost position and simultaneously moved longitudinally inward of the main frame of the machine, brought momentarily to rest in this raised and longitudinally moved position, thence lowered and simultaneously returned longitudinally to its normal lowermost position, where it again rests momentarily. The just described cycle of actuation of the trough continues intermittently, with precise regularity, during the operations of the machine.

The relative diameters of the rolls 25 and their axial location on opposite sides of the trough 24 is such that, when a stick 26 of snugly nested cones 27 is laid in the trough, pointed end inward and in which relation the stick of cones is carried through the machine, the peripheral faces of the continuously rotating rolls 25 are in contact with the base portions of the several cones in the stick during the time the trough is at rest in its lowermost position. Hence, at this time, inasmuch as the circumferences of the cones 27 are naturally knurled or otherwise roughened, the stick 26 is rotated, due to its frictional contact with the rolls 25 which, in reality, now support the stick of cones. This is because the proper relative positioning adjustment of the rolls is made with such exact nicety that the edges of the trough 24 are in a horizontal plane to just clear the peripheral base portions of the individual cones 27. But, even should the stick 26 of the cones 27 be resting directly on the trough 24, the stick, due to natural warping which has caused a slight distortion and irregularity in the circular contour of the base portions of the cones and possibility of their non-precise axial alignment in the sticks, comes frequently in contact with either or both of the rolls 25 and it is accordingly rotated.

When the trough 24 is raised and moved longitudinally inward, in that part of its cycle of actuation as hereinbefore stated, the stick 26 of the cones 27 is lifted clear of the rotating rolls 25 and carried on the trough the length of the stroke of the latter. Then, as the trough lowers and returns longitudinally to its normal lowermost position of rest, the stick 26 of the cones 27 is again brought into contact with the pair of rolls 25 and thereby again rotated. Thus, the stick of cones is intermittently rotated and carried longitudinally, step-by-step, through the machine.

While the weight of the stick 26 of the nested cones 27 is sufficient to make the stick hold in place by its frictional contact with the trough 24 so as to effect an intermittent feeding of the stick through the machine, special provision is

preferably made for a more positive, step-by-step, longitudinal movement of the stick. For this purpose a feeder lug 28 is provided in the trough 24 at the inner end thereof, as shown more clearly in Fig. 12. This lug 28, on the feeding stroke of the trough 24, engages behind the shoulder afforded by the edge of the exposed annular base of the cone 27 just ahead thereof in the stick 26. Thus, the stick 26 is moved positively to bring each cone 27 of the stick in succession to a definite position in the machine to receive a colored marking band 29, as will be later more specifically described.

To assure the feeding of the stick 26 of the cones 27 in the nested assembly thereof, a pusher element 30 is preferably provided as shown in Figs. 6, 7, 10, 11, 13 and 14. This element, as shown, comprises a weighted, vertical, generally rectangular block 31 having a bevelled lower end portion 32 corresponding to the angularity of the V-shape trough 24 so as to rest in the latter, as a counterpart thereof, when the trough is in its raised position and during the stick-feeding stroke in that cycle of its actuation.

The pusher element 30 is placed by hand of the attendant or operator of the machine, directly against the outer endmost cone 27 of the stick 26, the cones of which are replenished in nested groups or sticks from time to time as the marked cones are taken from the delivery end of the machine, as will be later more specifically described. In this way, there is a long, continuous stick of cones maintained throughout the major length of the machine and the pusher element 30 is always against the open end of the stick.

During the time the trough 24 is in its normal lowermost position, the pusher element is supported slightly elevated clear of the trough. This is accomplished by the provision of a stationary carrier frame, comprising a pair of longitudinally extending, horizontal rails 33, preferably L-shape in cross section, as shown more clearly in Fig. 10. These rails are located laterally outward from the feeder rolls 25 in near, parallel relation thereto. They are rigidly cross-connected at their front ends by a transverse frame member 34, and, at a short distance inwardly from said transverse frame member, they are mounted on right angular, upstanding, supporting brackets 35 that are respectively secured at their lower ends to the side rails of the lead-in extension 22 of the main frame of the machine.

The carrier frame side rails 33 are rigidly supported, near their inner ends, on posts 36 which extend up vertically from a top plate 37 that covers the middle stand portion 21 of the main frame of the machine. On these stationary carrier frame rails 33 are slidably supported the end portions 38 of a crosshead 39 of the pusher element 30. This crosshead is preferably L-shape in cross section and has one of its flanges disposed vertically upward, the other flange thereof being, of course, horizontal and resting with its opposite end portions flatwise on the upstanding flanges of the side rails 33 of the stationary carrier frame, that is to say, when the trough 24 is in its normal lowermost position. During this time, the bevelled lower end 32 of the pusher element block 31 is elevated out of contact with the trough 24. However, when the trough is raised from its normal lowermost position for the cone-feeding stroke in its aforesaid cycle of actuation, it comes in contact with and lifts the block 31, thereby

raising the crosshead 39 of the pusher element 30 some distance clear of the vertical flanges of the side rails 33 of the stationary carrier frame. The pusher element 30, thus supported on the trough 24 and free from the rails 33, moves in place with the trough on its cone-feeding stroke.

For convenience in the handling, placing and removal of the pusher element 30 by the attendant or operator of the machine, the element is provided with a knob 30' at the middle of the crosshead 39.

The trough 24 has a depending lug 40 at its inner end, hingedly attached, as at 41, to the upper end of a feeder bar 42 whose lower end portion is slotted longitudinally thereof, as at 43, and mounted on a crosspin 44 of a bifurcated lug 45 that is secured to a horizontal, lower member 46 of the middle stand portion 21 of the main frame of the machine (see Fig. 15). With the feeder bar 42 thus provided and mounted it is capable of combined vertical movement and oscillation in a direction longitudinally of the machine, which actuation is effected by the following described mechanism.

First, it is pointed out that the bar 42 is yieldably held in a normally retracted position and returned to such position by a spring element 47 which is attached at one end either directly to the bar itself or to some element carried by the bar for the actuation thereof, as will presently more fully appear; and, at its opposite end, to some stationary part of the machine. Conveniently, as shown at 48, in Fig. 6, this end of the spring may be attached to a box or casing 49 which houses a conventional reduction gear that is included in the power drive mechanism of the machine to be later described in detail.

Next, the bar 42 is intermittently oscillated by a double-nosed cam element 50 which is fixed on a countershaft 51 that extends transversely of the middle stand portion 21 of the machine main frame and is driven from a main drive shaft 52 by a meshed pair of miter gears 53, as shown in Fig. 6.

As the cam element 50 rotates, its diametrically-opposite noses alternately move into engagement with an anti-friction roller 54 journaled on the feeder bar 42, thereby, in turn, rocking the bar 42 on the pivot pin 44 of the supporting lug 45 in the direction to move the trough 24 to advance the stick of cones one step in the feeding actuation thereof.

During the just above noted actuation of the feeder bar 42, the bar is simultaneously lifted longitudinally upward. This is accomplished by means of a lifting rod 55 having an offset, bifurcated yoke 56 at its upper end. The yoke is hingedly secured to the bar, as at 57, and it is here noted that the aforesaid spring element 47 is conveniently attached to an eye-stud 47' on the yoke, as shown more clearly in Figs. 15 and 16.

The lower end of the rod 55 is pivotally attached, as at 58, to a lever-arm 59 fixed on a main rock-shaft 60. The rock-shaft, as shown more clearly in Figs. 15 and 16, is journaled in bracket bearings 61, bolted, as at 62, to the horizontal main frame member 46, and it is rocked in its bearings by a main lift-rod 63 that is pivotally connected at its lower end to a rock-arm 64 of the shaft, as at 65. The upper end of the lift-rod 63 is pivotally attached, as at 66, to a main lift-arm 67 that is pivotally mounted at one end, as at 68, to a bracket bearing 69 depending from the adjacent side rail of the middle stand portion 21 of the machine main frame.

On the free end of the lift-arm 67 is an eccentric, cam-engageable, head 70. This head 70 has its eccentrically disposed, curved, working edge 71 in the path of a double-ended cam 72 fixed on the countershaft 51. As shown more clearly in Figs. 15 and 16, the diametrically-opposite end portions of this cam 72 are provided with antifriction rollers 73 which, respectively, alternately engage and act upon the eccentrically disposed, curved, working face 71 of the head 70 of the lift-arm 67, thereby lifting the arm, which, in turn, correspondingly lifts the rod 63 and thus effects the rocking of the shaft 60 and the consequent actuation of the several aforesaid parts of the mechanism connected with the shaft.

The mechanism thus far described has to do with the control and actuation of the feeder bar 42 that supports the inner end of and actuates the cone-stick carrying and feeding through 24. Now, provision for supporting and actuating the front end of the trough will be described.

Mounted at its opposite ends on the carrier frame supporting brackets 35, is a transverse, horizontal shaft 74 that carries a vertically oscillatable yoke 75. In this yoke 75 an annularly V-grooved roller 76 is journaled and located directly under the adjacent near-end portion of the trough 24 so as to support the latter and permit its longitudinal reciprocation on the roller. The angularity of the peripheral V-groove in the roller 76 corresponds to that of the V-shape trough 24. Hence, the trough at all times rides self-centered and without any transverse tilting on the roller.

Pivotally attached to the yoke 75, co-axially with the grooved roller 76, as shown in Fig. 11, is a depending yoke 77 having a stem or shank 78 extending downwardly therefrom. The lower end portion of the stem or shank 78 is apertured for the reception, pivotally therein, of the right-angularly turned end portion of a crank-arm 79 of a rock-shaft 80 that is journaled in depending bracket bearings 81 on the adjacent side rails of the lead-in extension 22 and middle stand portion 21 of the machine main frame.

The rock-shaft 80 extends to the immediate transverse region of the hereinbefore described feeder bar 42 and the several associated lifting rods and actuating arms. At this end of the rock-shaft 80 is a crank-arm 82 (see Fig. 16), pivoted, as at 83, to the upper end of a lifting rod 84, the rod being pivotally attached at its lower end to the feeder bar 42, as at 85.

The lifting rod 84, attached as it is to the feeder bar 42, is thus lifted with the feeder bar in the actuation of the latter, thereby rocking the shaft 80 through the medium of the crank 82, while, simultaneously therewith, the yoke 77 is lifted and elevates the annularly grooved roller 76 so that the immediate portion of the trough 24 carried thereon is in the same plane as the inner end portion of the trough. The trough is thus maintained horizontally, whether in its lowermost or highest position and also during its movements to and from such positions.

Referring to Figs. 6 and 8, the driving power for the machine, as shown, includes an electric motor 86, which, as shown, is mounted on a substantial horizontal bar 87 secured at its opposite ends to a pair of the legs 21' at one side of the middle stand portion 21 of the machine main frame. As shown in Fig. 6, the base 88 of the motor is bolted on a supporting plate (or frame) 89 having a pair of lugs 90 that have axially aligned bores so as to

be sleeved on the bar 87 and pinned or otherwise securely fastened thereto.

On the armature shaft 91 of the motor 88 is a pulley 92, belted as at 93, to a pulley 94, of larger diameter, on a stub-shaft 95 that drives a conventional reduction gear, not shown in detail but housed in the hereinbefore described and conventionally shown box 49. From the reduction gear, which, for the particular purpose of the machine, may be of the ratio 25:1, extends a driven stub-shaft 96. This stub-shaft is connected by a conventional flexible coupling 97 to the hereinbefore described main drive shaft 52 of the machine that drives the aforesaid countershaft 51 through the intermediary of the miter gears 53.

On the main drive shaft 52 is a sprocket wheel 98 that, by the chain 99, drives two smaller sprocket wheels 100 fixed, respectively, on a pair of countershafts 101 that are respectively journaled in upstanding standards 102. The countershafts 101 are located laterally outward from the feeder rolls 25, and the sprocket chain 99 is carried under the main driving sprocket wheel 98, thence up through an opening provided therefor in the main frame bed-plate 37 and around the outer peripheral portion of one of the smaller sprocket wheels 100, then down over the inner peripheral portion of the same wheel and under an idler sprocket wheel 103 (see Fig. 8) that is journaled in a small standard 104 (see Fig. 18) on the bed-plate 37 and axially beneath the cone-stick carrying and feeding trough 24. From the wheel 103 the chain is carried up and around the inner peripheral portion of the second sprocket wheel 100, thence down over the outer peripheral portion of said wheel and through a second opening in the bed-plate 37 to the main driving sprocket wheel 98.

With the above described sprocket-and-chain arrangement, the two countershafts 101 are rotated in the same direction, and the pair of feeder rolls are correspondingly rotated, each roll being provided at its inner end with a sprocket wheel 105 connected by a chain 106 to a driving sprocket wheel 107 (see Figs. 8 and 18) on the companion countershaft 101 laterally outward therefrom.

Referring now to Figs. 17 and 18, on one of the countershafts 101 is fixed a plain marking wheel 108, while on the other shaft is fixed a flanged marking wheel 109. These marking wheels are of the same diameter as to circumferential cone-marking faces and said faces are just sufficiently spaced apart, in opposed, cooperative relation to each other, so that, when the stick 26 of the nested cones 27 is moved longitudinally between them, the bases of the respective cones in the stick are successively in tangential contact with and supported by said circumferential marking faces of the pair of wheels. The wheels 108 and 109 rotate in the direction like the feeder rolls 25 and their circumferential cone-contacting faces are bevelled at an angle corresponding to the taper of the respective cones 27 of the stick 26.

The two wheels 108 and 109 are aligned transversely of the machine and in a position relatively a short distance beyond the inner end of the cone carrying and feeding trough 24, so that when the cone-stick is fed step-by-step in the actuation of the trough, the several cones of the stick are brought successively with their base portions in position to be marked with the material applied by the wheel 108 (see Figs. 1, 2 and 4).

Preferably, the circumferential faces of the two wheels 108 and 109 are finely knurled or otherwise suitably roughened. This particular provi-

sion on the wheel 108 (the one to receive and directly apply the marking material to the respective cones of the stick) is to assure the spreading of the material, which is liquid, evenly over the peripheral surface of the wheel, i. e., the marking liquid flows in the numerous valleys between the minute pyramidal protuberances produced by the knurling or roughening process. The same provision on the companion wheel 109 is to prevent undue removal of the marking material from the cones as applied by the wheel 108 and to insure a more even distribution of the material within well-defined confines of the narrow, colored band 29 produced on the cone. In this connection, it is also noted that the material of which the cones are made is somewhat absorptive in character, thus taking the characteristic marking liquid into the essentially roughened surfaces of the kind of cones for the aforesaid marking of which the present machine is primarily intended. With this characteristic feature in the cone itself, the knurling or roughening of the marking wheel 109 is of good advantage in a clear-cut and well-defined marking of the cone.

The annular, marginal, flange 110 of the wheel 109 is at the side of the wheel towards the cone carrying and feeding trough 24. It is so provided and located that, when the cone-stick 26 is fed by the actuation of the trough, step-by-step as aforesaid, the edge of the base portion of the particular cone 27 of the stick positioned for the marking thereof is just forward of the wheel flange. In this connection, it is here pointed out that, due to the "ratchet-tooth" effect of the stick 26 of the nested cones 27 and the travel of the stick pointed end forward through the machine, the stick, during the feeding thereof, rides freely and without hindrance across the wheel flange 110. Yet the flange, when behind the shoulder afforded by the particular positioned cone of the stick, prevents longitudinal movement of the engaged cone in the opposite direction.

It is further pointed out that, by the provision of a delivery trough 111 on the main frame extension 23, at an upward inclination from the cone-marking elements of the machine, as shown schematically in Figs. 1 and 2, but more in detail in Figs. 6 and 7, that portion of the cone-stick in which the respective cones have been marked, in riding up the trough, tends to lag and press back against the flange 110 of the marking wheel 109. This effect (illustrated in Fig. 12) is attained because, even though the cone-stick is nested and self-held intact for the purposes of the present invention, it is susceptible of appreciable flexion, not only caused in the lifting, feeding and lowering action of the feeder trough 24, but in conformity with the angular change in the direction of its travel onto and up the delivery trough 111.

At this time it is still further pointed out that a heated drying tunnel 112 may be provided, as indicated conventionally in Figs. 1 and 2. This tunnel, which, as shown, is open at its opposite ends, as at 113, is provided at its middle with a hot-air supply pipe 114 leading from any suitable source (not shown). It is to be understood that any other suitably heated, or even non-heated, means may be provided for drying the marking bands 29 on the cones. So, too, the marked cones may be taken by hand from the stick as it nears the discharge end of the delivery trough 111. In some installations of the machine, a special mechanical device may be provided for

breaking the stick and removing the marked cones.

Referring to Figs. 13 and 14, during the marking operation, the portion of the cone-stick in the immediate region of the marking wheels 108 and 109 is pressed and held in the trough 24 and in intimate contact with the feeder rolls 25. This is done by the major body portion of a presser roller 115, having an annular peripheral groove 116 that separates a relatively narrow circumferential portion 117 from the larger body portion.

The narrow circumferential portion 117 of the roller 115 is vertically aligned, directly above the marking wheels 108 and 109 and presses the base portion of the interposed cone of the stick directly into contact with the wheels. It is of a width approximately that of the band 29 marked on the cone, possibly slightly narrower or wider. The reason for annularly grooving the roller 115 and thus separating the narrow circumferential portion 117 from the main body circumference is to prevent flowing onto the major surface of the roller the marking material taken up on the narrow circumferential portion 117 as it rolls in contact with the cone having the material applied. The major circumferential portion of the roller, thus kept free of the marking material, has only to do with the pressing and holding of a few of the nested cones of the stick just prior to their successive movement into marking position. This avoids any possibility of smearing the cones before the intended marking thereof.

As shown more clearly in Figs. 7 and 9, the presser roller 115 is carried on a vertically swingable, horizontal arm 118 that is hingedly mounted at one end, as at 119, on a cross rod or shaft at the top of an upright frame or standard 120 secured on an adjacent side rail portion of the middle stand 21 of the machine main frame. The free end portion of the arm 118 is extended through a guide slot 121 in an upright bar 122 secured on the opposite side rail portion of the main frame, as at 123.

A spring element 124 is attached at one end to the free end of the roller-carrying arm 118, as at 125, and has its opposite end secured by an eye-stud 126 to the head of the bolt that fastens the upright bar 122 to the main frame side rail, as shown, or it may be secured in any other suitable manner. By this provision the presser roller 115 is yieldably held constantly under tension of the spring 124 and normally in a lowered position so as to bear on the cone-stick. However, during the time that the trough 24 is raised on its stick-feeding stroke, the presser roller is lifted clear of the cone-stick carried by the trough. This is accomplished by means of a lifting rod 127 that is pivotally attached at its upper end to the roller-carrying arm 118, as at 128 in Fig. 9. As shown in Fig. 11 its lower end is pivotally attached, as at 129, to a lifting arm 130 fixed on the rock-shaft 60 and of approximately the same length and throw of the arm 64 that rocks said shaft 60 when the aforesaid rod 63 is lifted by the actuation of the main lift-arm 67 of the machine. Thus, the lifting of the presser roller 115 is synchronized with the corresponding actuation of the cone-feeding trough 24.

Some distance beyond the marking wheels 108 and 109 there is a pair of delivery rolls 131, of approximately the same diameter as the feeder rolls 25 and substantially in axial alignment therewith. These delivery rolls are rotated in the same direction as the aligned feeder rolls, they being

each provided with a sprocket wheel 132 at the outer end thereof that is driven by a chain 133 from a sprocket wheel 134 fixed on an extension 101' of one of the countershafts 101 on which the marking wheels are carried and rotated (see Fig. 18).

The delivery rolls, as shown, are relatively shorter in length than the feeder rolls 25, i. e., they need be only long enough to support the cone-stick 26, in their immediate region, so as to assist in maintaining rotation of the stick in its longitudinal travel through the machine. The frictional engagement between the snugly nested cones of the stick is sufficient to hold the assembled stick intact while otherwise unsupported in spanning the comparatively short space between the marking wheels 108 and 109 and the inner ends of the pair of delivery rolls 131. This space is provided to allow of appreciable drying and setting of the annular, colored band 29 marked on the respective cones of the stick. Otherwise, there might occur a smearing of the cone-stick (beyond the intended marking) by longer rolls whose inner ends were in close proximity to the marking wheels 108 and 109.

From the rolls 131 the marked cones of the stick pass directly onto the aforesaid delivery trough 111, whence the marked bands 29 are thoroughly dried while passing through the drying chamber or tunnel 112.

The several rolls 25 and 131, and the two countershafts 101 and their extensions 101' are conventionally journaled in upstanding bracket bearings designated generally in the drawings by the numeral 135, as shown in Fig. 18. In this connection, it is noted that the rolls 131 are mounted on countershafts 131'.

For supplying the marking liquid, designated, as shown, by the numeral 136, a rectangular pan or container 137 is provided. This pan or container extends transversely of the machine main frame, beneath the marking wheels 108 and 109, and is, preferably, removably mounted in rectangularly-pocketed, supporting brackets 138 provided therefor at opposite sides of the main frame.

Rotating with its lower portion immersed in the liquid marking material in the pan or container 137, is a transfer disk or applicator 139, preferably made of compressed fiber, although other material may be used for the purpose. The disk 139 is preferably tapered from its hub portion to periphery, so as to produce a very narrow or nearly sharp, circumferential, contact face or edge to bear on the circumferential face of the plain marking wheel 108 (see Figs. 17 and 18 for a clear illustration thereof). This form of disk 139 transfers only a minimum quantity of the marking liquid from the pan or container 137. The liquid, which is of a characteristic nature as more fully and specifically described in the above mentioned copending application, quickly spreads in the recesses of the knurled or otherwise roughened peripheral surface of the marking wheel 108. If desired or found necessary, a wiper element 140 may be provided to act on the peripheral material-applying face of said wheel 108, just after moving from contact with the transfer disk or applicator 139. So, too, another wiper 141 may or may not be provided to wipe the peripheral face of the flanged marking wheel 109 to rid it of any of the marking material that may have been taken off the wet marking band 29 applied to the interposed cone of the stick by the plain wheel 108.

As shown, the disk 139 has its hub portion fixed on the end of a vertically oscillatable, substan-

tially horizontal, countershaft 142. This shaft is journaled near its ends in upstanding, right-angular, bearing extensions 143 of an elongated supporting element 144 that is bracketed, as at 145 on a rod 146 extending transversely of the machine main frame and rotatably mounted at its ends in supporting brackets 147 depending from the adjacent side rails of the frame (see Figs. 17 and 18). The free end of the longitudinal, elongated, supporting element 144 is supported by a spring element 148, suspended from an arched cross-member 149 of the machine frame, with its lower end attached to a stirrup 150 that extends under the element 144 and straddles the countershaft 142. The spring 148 is constantly under tension to lift the element 144 and thereby yieldably hold the transfer disk 139 normally in working contact with the marking wheel 108.

The disk 139 is rotated in a direction opposite to that in which the marking wheel 108 rotates. This is accomplished by the provision of a pulley 151 on the countershaft 142, driven by a crossed belt 152 from a pulley 153 provided on the extension 101' of one of the countershafts 101 that carry the marking wheels 108 and 109. As shown in Figs. 17 and 18, the pulley 153 is located on the shaft extension from the flanged marking wheel 109.

In the operation of the machine as herein described and illustrated in the drawings, an attendant first places a stick 26 of the cones 27, pointed end forward, on the trough 24 between the feeder rolls 25. Thereafter, from time to time, as the stick progresses in its longitudinal travel through the machine, shorter cone-stick sections are added to the advancing stick already in the machine. This is readily accomplished manually, as the trough 24 and cooperating rolls 25 are at a convenient elevation from the floor or platform where the machine is located. So, too, the several parts of the machine that carry and act upon the cone-stick are uncovered and conveniently accessible, and the stick itself is exposed to view and accessible throughout substantially its entire length for inspection and such adjustments that may possibly be necessary on the part of the attendant.

The working of the machine is entirely automatic and the feeding of the cone-stick and successive marking of the constituent cones is effected with rapidity and exact nicety and precision.

The advanced portion of the stick, comprising the marked cones, is conveniently accessible and readily taken apart and removed from the delivery trough 111, either manually, by hand of the attendant, or else by some practical mechanical means, which latter, of itself, is not a part of the present invention and, therefore, not shown in the drawings.

While the herein illustrated and described apparatus is a practical embodiment of the invention, the same may be modified and changed in many particulars within the spirit and scope of the appended claims. The invention, therefore, is not limited to the specific construction and arrangement shown.

We claim:

1. A method of color banding a plurality of hollow cones internested to form an elongated stick of cones, comprising advancing said stick longitudinally and intermittently to a color banding station, stopping the longitudinal movement of said stick intermittently for color banding of

the cones that come successively into registry with the color banding station, rotating the cones during the banding operation to provide an annular band around the periphery of each successive cone, and repeating this cycle of operations to cause each of the cones in the stick to be banded and then move away from the banding station.

2. A method of color banding a stick of cones as defined in claim 1 and in which the stick is elevated to a position above the marking station during longitudinal advancement of the stick and is lowered into banding position during the banding operation and while at longitudinal rest.

3. The method of marking a hollow cone with a distinctively colored band encircling a circumferential base-end portion thereof, comprising the internesting of a plurality of the cones one within another in an elongated stick with substantial base-end exposure, moving the stick longitudinally, with intermittent, step-by-step travel, past and in proximity to a mark applying means, applying by said means a marking medium around the peripheral faces of the exposed base-end portions of the respective cones of the stick as the same are successively brought into a position coincident with the transverse plane of the mark applying means, and then drying the marking medium thus applied, after the respective marked cones of the stick are moved beyond the place of marking application.

4. An apparatus for marking individually each of a plurality of hollow cones assembled internested and held together by detachable frictional engagement in an elongated stick in which the circumference of a substantial base-end portion of each cone is exposed, such apparatus comprising means for supporting the cone-stick intact, a stationary supply of said marking medium, moving transfer means in contact with said medium and adapted for applying externally said marking medium on the respective exposed base-end portions only of the several cones of the supported stick, and means for establishing relative intermittent movement cooperatively between the supported cone-stick and said means of application of the marking medium whereby to effect intermittent marking of the cones.

5. An apparatus for marking individually each of a plurality of hollow cones assembled internested and held together by detachable frictional engagement in an elongated stick in which the circumference of a substantial base-end portion of each cone is exposed, such apparatus comprising means for supporting the cone-stick intact, a supply of color, moving transfer means in contact with said color and adapted for applying externally a distinctively colored band around the respective exposed base-end portions only of the several cones of the supported stick, and means for establishing relative intermittent movement cooperatively between the supported cone-stick and said means of application of the colored band whereby to effect intermittent banding of the cone bases and to omit application of color to the remainder of the cones during said intermittent movement.

6. A machine for marking bands on the circumferential faces of the exposed base-end portions of hollow cones and the like, assembled internested, one within another, in an elongated stick, said machine comprising a laterally spaced pair of power-driven parallel rolls rotating in the same direction, whereby to rotate, in the opposite

direction, a cone-stick disposed lengthwise and supported thereon, pointed end of the stick forward, a longitudinal trough element disposed parallel with and between said pair of rotating rolls, beneath the cone-stick supported on the rolls, power means actuating said trough with a parallel rotary motion from end to end thereof, first upwardly and forwardly to thereby lift the superimposed cone-stick and move the same bodily one step forward, thence downwardly and rearwardly, depositing the cone-stick in its thus advanced stage again on the said spaced pair of rolls, a laterally spaced pair of rotating marking wheels located forward of the ends of the said trough and the spaced pair of cone-stick-supporting rolls, a distance corresponding to one step in the intermittent longitudinal travel of the cone-stick, whereby the respective cones of the stick are brought successively each with its exposed base portion in transverse coincident alignment between the peripheries of the said marking wheels, means rotating said marking wheels in the same direction as said first mentioned pair of cone-stick supporting rolls, a marking material container located beneath said marking wheels, means for transferring an ample quantity of marking material from the container below to the peripheral face of one of said marking wheels, a superimposed presser roller normally at an elevation to clear the cone-stick passing longitudinally thereunder, and intermittently operating means for lowering said presser roller into pressing contact with the cone-stick in the region of the same where supported on the adjacent end portions of the said spaced pair of supporting rolls and on the said marking wheels.

7. A machine as set forth in claim 6 and further comprising a laterally spaced pair of longitudinal delivery rolls located forward from the marking wheels, said delivery rolls being similar in diameter to and substantially in axial alignment with the said first mentioned pair of cone-stick-supporting rolls, and means for rotating said delivery rolls in the same direction and simultaneously as said first mentioned cone-stick-supporting rolls are rotated.

8. A machine as set forth in claim 6 and further comprising a laterally spaced pair of longitudinal delivery rolls located forward from the marking wheels, said delivery rolls being similar in diameter to and substantially in axial alignment with the said first mentioned pair of cone-stick-supporting rolls, means for rotating said delivery rolls in the same direction and simultaneously as said first mentioned cone-stick-supporting rolls are rotated, and a longitudinal delivery trough extending at an upward inclination forwardly from said pair of delivery rolls.

9. A machine as set forth in claim 6 and further comprising a laterally spaced pair of longitudinal delivery rolls located forward from the marking wheels, said delivery rolls being similar in diameter to and substantially in axial alignment with the said first mentioned pair of cone-stick-supporting rolls, means for rotating said delivery rolls in the same direction and simultaneously as said first mentioned cone-stick-supporting rolls are rotated, a longitudinal delivery trough extending at an upward inclination forwardly from said pair of delivery rolls, and a drier element located in cooperative relation to said delivery trough and creating an effective drying zone through which the marked cone portions of the stick travel on said delivery trough from said marking wheels and said delivery rolls.

10. A machine for marking a stick of hollow cones internested one within another with substantial base-end exposure of each cone, such machine comprising a pair of peripherally opposed and aligned marking wheels, spaced apart but in close relation to each other so as to support the cone-stick when the same is passed longitudinally across and between the wheels, separate cooperative means for supporting and rotating the cone-stick and also for effecting an intermittent longitudinal travel of the cone-stick so as to bring the exposed base-end portions of the respective cones of the stick successively into position coincident with the transverse plane of said marking wheels, means for rotating the marking wheels so as to rotate the cone-stick when in contact therewith and in the same direction of rotation as effected by said preceding mentioned cone-stick supporting and rotating means, and means for supplying marking material to the periphery of at least one of said marking wheels whereby a band of such material is applied to the circumference of the exposed base-end portion of the cone of the stick riding rotatably on said marking wheels.

11. In a machine for marking annularly the circumference of the exposed base-end portions of hollow cones internested one within another in an elongated stick, such machine comprising cooperative means for supporting, rotating and feeding the stick longitudinally in a step-by-step travel, a pair of peripherally opposed and aligned marking wheels, spaced apart but in close relation to each other and located so as to support the exposed base-end portions of the cones of the stick as the same are respectively brought into coincidence with the transverse plane of said wheels in the said step-by-step travel of the stick, a marking material container, and means for transferring the marking material from said container to the periphery of at least one of said marking wheels, the said means comprising a tapered, sharp-edged, circular disk running partially immersed in the material within the container and its periphery rolling in contact with the periphery of the marking wheel.

12. In a machine for marking annularly the circumference of the exposed base-end portions of hollow cones internested one within another in an elongated stick, such machine comprising cooperative means for supporting, rotating and feeding the stick longitudinally in a step-by-step travel, a pair of peripherally opposed and aligned marking wheels, spaced apart but in close relation to each other and located so as to support the exposed base-end portions of the cones of the stick as the same are respectively brought into coincidence with the transverse plane of said wheels in the said step-by-step travel of the stick, a marking material container, and means for transferring the marking material from said container to the periphery of at least one of said marking wheels, the said means comprising a movably mounted, tapered, sharp-edged, circular disk partially immersed in the material within the container, yieldable means supporting said disk in peripheral contact with the marking wheel, and power means for rotating said disk synchronously with the rotation of the contacted marking wheel.

13. A machine for marking individual hollow cones internested one within another in an elongated stick, with substantial base-end portion circumferential exposure of each cone, such machine comprising means for supporting the cone-stick lengthwise and rotating the stick about its longitudinal axis, cooperative means for lifting the

cone-stick from said supporting and rotating means and moving the stick lengthwise with a step-by-step travel, the means of support and rotation and the means of lift and longitudinal travel being correlated and synchronized so that rotation of the stick occurs except during its periods of lift and longitudinal travel, marking means disposed transversely of the axis of the cone-stick and located forward of said supporting and rotating means and of said lifting and lengthwise step-by-step moving means for the stick, said marking means being relatively positioned so that, in the step-by-step travel of the stick, the marking means is reached by the exposed base-end portions of the respective cones of the stick, each in succession, at the termination of each pause in the longitudinal travel of the stick, and means for effecting the application of the marking means to the stick so as to annularly mark the oppositely positioned cone of the rotating stick.

14. A machine for marking individual hollow cones internested one within another in an elongated stick, with substantial base-end portion circumferential exposure of each cone, such machine comprising means for supporting the cone-stick lengthwise and rotating the stick about its longitudinal axis, cooperative means for lifting the cone-stick from said supporting and rotating means and having provision for positive engagement with the base-end-edge of one of the cones for moving the stick lengthwise with a step-by-step travel, the means of support and rotation and the means of lift and longitudinal travel being correlated and synchronized so that rotation of the stick occurs except during its periods of lift and longitudinal travel, marking means disposed

transversely of the axis of the cone-stick and located forward of said supporting and rotating means and of said lifting and lengthwise step-by-step moving means for the stick, said marking means being relatively positioned so that, in the step-by-step travel of the stick, the marking means is reached by the exposed base-end portions of the respective cones of the stick, each in succession, at the termination of each pause in the longitudinal travel of the stick, and means for effecting the application of the marking means to the stick so as to annularly mark the oppositely positioned cone of the rotating stick.

15. A machine for color banding a plurality of hollow cones internested to form an elongated stick of cones, comprising a supply of coloring material, means for transferring said coloring material from the supply to the cones, means for advancing said stick of cones longitudinally and intermittently to said color transfer means, means for stopping the longitudinal movement of said stick intermittently as the cones come successively into registry with said color transfer means, means for rotating the cones while at longitudinal rest and in cooperation with said color transfer means so as to provide a restricted annular band around the periphery of each successive cone, and means for repeating this cycle of operations to cause said cones to move in step by step manner and to be banded by said color transfer means.

16. A machine for applying color bands to a stick of cones as defined in claim 15, and characterized further by means for intermittently raising and lowering said stick of cones during the step by step advance of the stick of cones.

CHARLES K. DUNLAP.
LAWRENCE B. STOGNER.