

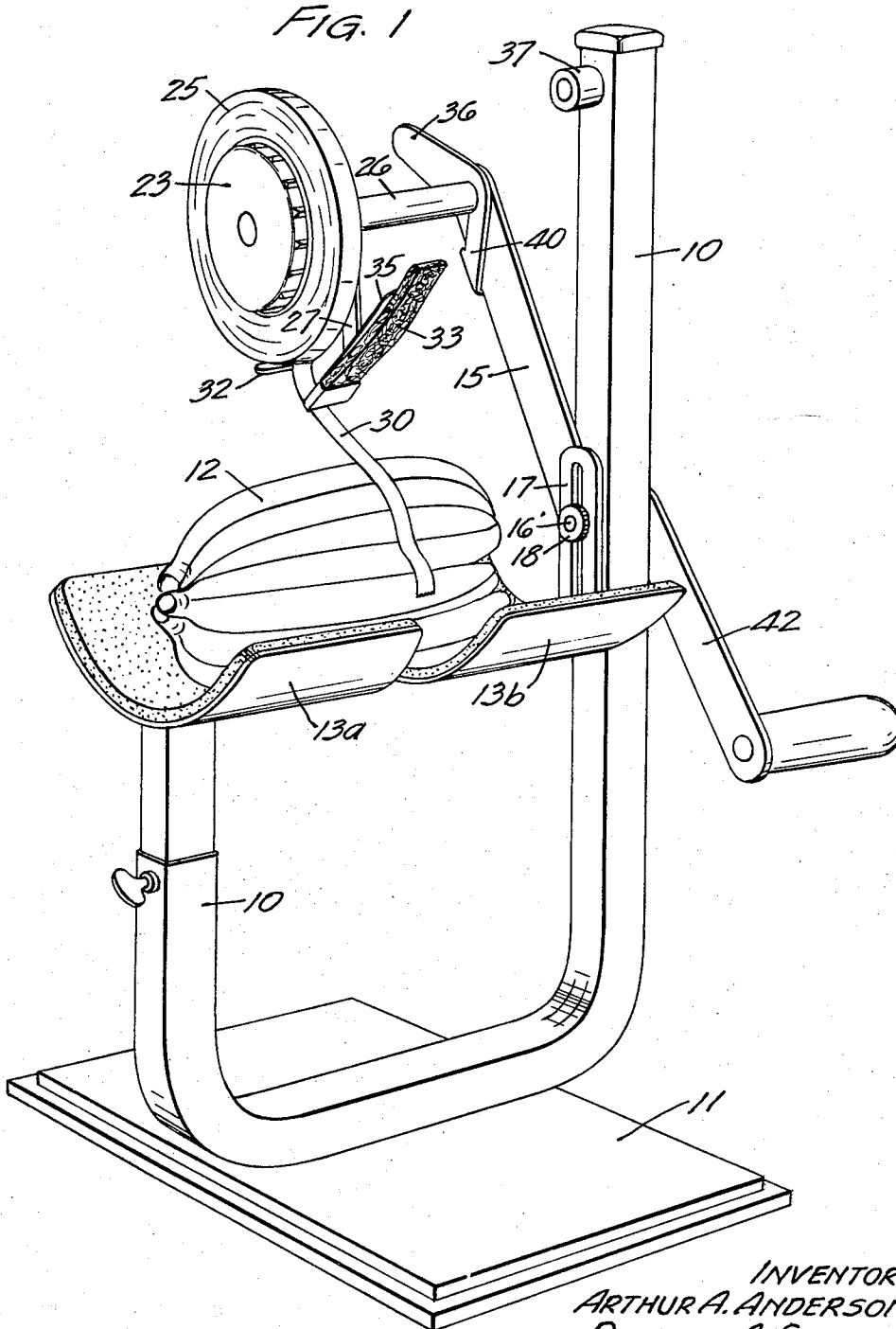
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A. A. ANDERSON ET AL  
CIRCUMFERENTIAL TAPE APPLYING

2,945,336

Filed April 4, 1957

3 Sheets-Sheet 1



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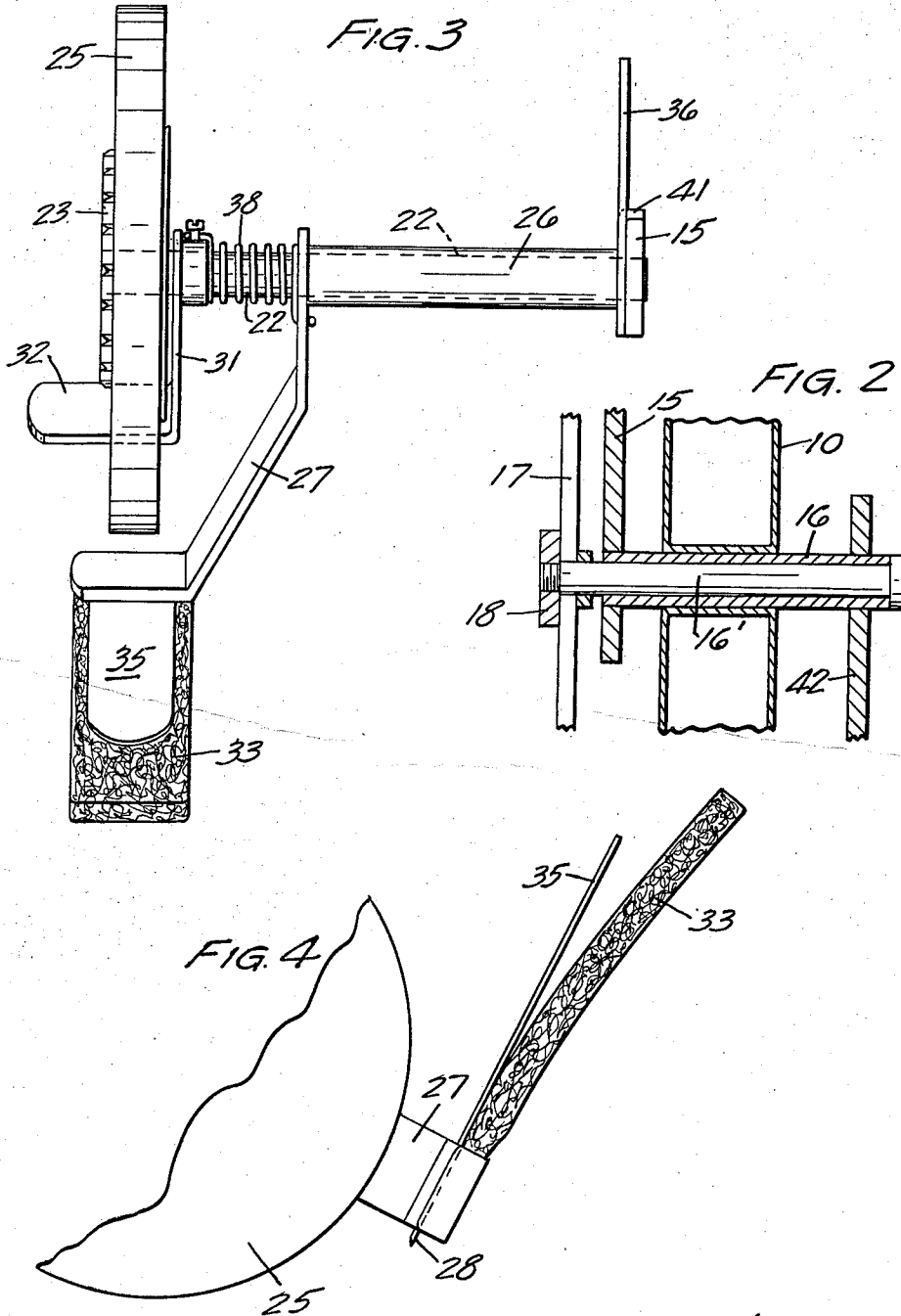
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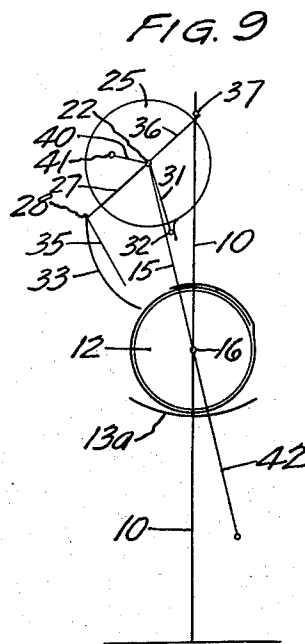
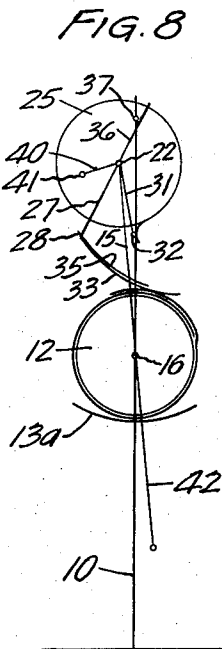
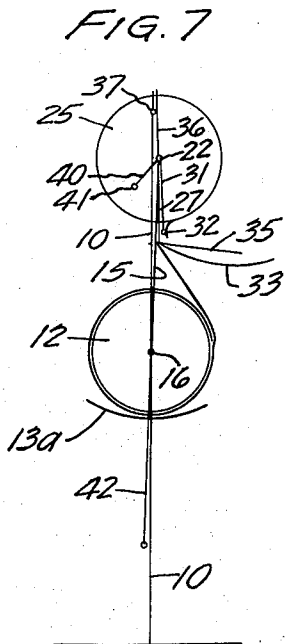
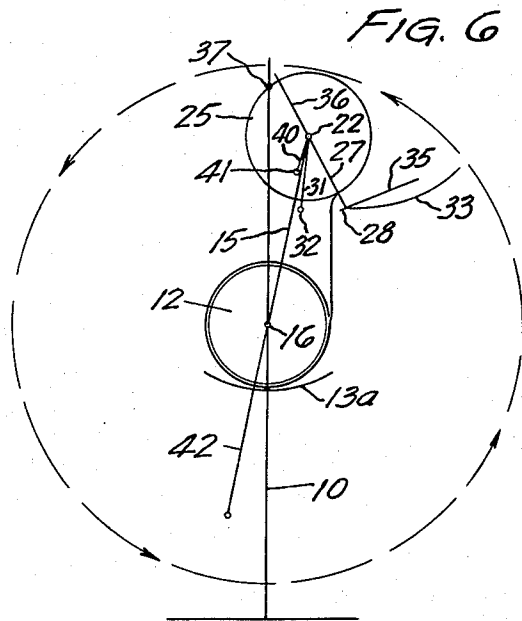
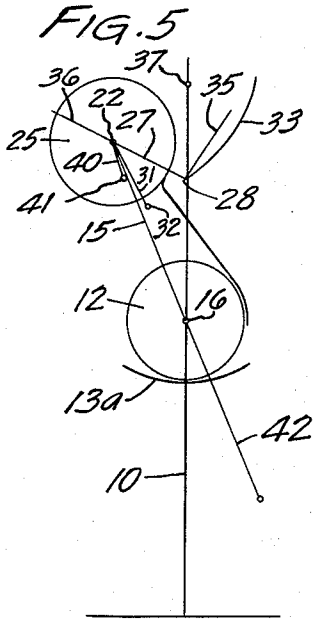
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**CIRCUMFERENTIAL TAPE APPLYING**

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5 Claims. (Cl. 53—198)

This invention relates to the application of tape to articles, particularly to the operation sometimes called girth wrapping wherein a length of tape is applied or wrapped around the article, usually at or near the central portion of the article for all or nearly all the entire circumference or distance.

One objective is to provide an apparatus useful for produce banding wherein a bundle or bunch of elongate articles of food such as bananas, celery or asparagus, are held together by a length of tape that extends around the bundle. A further objective is to provide such an apparatus wherein the bundle or other article is supported at both ends while the tape is being applied around the central portion of the article.

The invention provides an apparatus having a tape applying head, the head comprising tape roll mounting means and severing means. The head is propelled around the article in an orbit, applying the tape as it goes. As the head passes a given point, automatic actuation of the cutting means takes place after the desired length of tape has been applied.

An illustrative embodiment is described below and shown in the accompanying drawings in which:

Figure 1 is a perspective view of an apparatus for banding bundles of produce, such as bananas;

Figure 2 is a diagrammatic showing of the crank shaft assembly in axial vertical section;

Figure 3 is a plan view of the tape applying head;

Figure 4 is a side elevation of the tape wiping finger; and

Figures 5, 6, 7, 8 and 9 are diagrammatic showings of the operation of the apparatus.

A U-shaped frame 10 mounted on a base 11 has a means for supporting an article 12 in the form of two aligned slightly trough-shaped trays (a first tray 13a and a second tray 13b) which are attached to the frame and which are spaced apart in the direction of their alignment so that the two ends of the article will be separately supported with the portion to be taped (the central portion) exposed around the entire circumference of the article.

A tape applying crank 15 is fixed to a crank shaft 16 which is journaled in the frame.

The crank shaft 16 has within it a smaller shaft 16', the two shafts being concentric and rotatable in respect to each other (Figure 2). A tray supporting bar 17 is fixed on the exposed end of the inner shaft 16' by a removable threaded thumb nut 18, the tray 13b being fastened to the lower end of the bar 17. The weight of the thus suspended tray holds it and the inner shaft 16' motionless as the crank 15 and the outer shaft 16 rotate.

Thus the second tray 13b is attached to the frame at a point on the axis of rotation of the tape applying crank 15.

A tape roll shaft 22 is fixed to the outer end of the crank 15 and is parallel to the axis of rotation of the crank. A drum 23 for holding a supply roll 25 of tape is rotatably mounted on the outer end of the shaft 22,

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and is aligned with the opening or space between the two trays 13a and 13b.

The shaft 22 also carries a rotatable elongate collar 26 between the drum 23 and the crank 15.

A radially extending cutting arm 27 is fixed to the end of the collar 26 adjacent the drum 23. A knife 28 is fixed to the end of the arm 27 in a position to engage one side of a withdrawn length of the tape 30 that extends from the roll 25 to the article 12 when the arm 27 is moved through a cutting stroke. A radially extending tape holding arm 31 is fixed to the shaft 22 adjacent the drum 23, its outer end turned to provide a tape holding member 32 in a position to engage the opposite side of the said withdrawn length at a point adjacent the point engaged by the knife, the knife engaging the tape at a point between the tape holding member 32 and the article 12.

A flexible tape wiping finger 33 is fixed to the end of the cutting arm 27, in a position to press the trailing end portion of the severed withdrawn length of tape against the article as the cutting arm completes its cutting stroke. The finger 33 is of felt, reinforced with a length 35 of thin flexible spring steel. The felt contacts the tape, with pressure being supplied primarily by the length of spring steel.

A radially extending trigger arm 36 is fixed to the end of the collar 26 adjacent the crank 15. A smooth-surfaced cylindrical cam 37 is rotatably mounted on the frame 10 in a position to engage the trigger arm 36 as the crank 15 turns, thereby to move the cutting arm 27 through the cutting and wiping stroke. A helical spring 38 on the shaft 22 is loaded to return the cutting arm 27 to its normal position when the trigger arm 36 passes out of contact with the cam 37. A radially extending stop arm 40 is fixed to the end of the collar 26 adjacent the crank 15, its outer end being turned so as to engage the crank, thereby providing a stop 41 for holding the cutting arm 27 in normal position against the impulse of the spring 38.

The tape roll shaft 22 and the parts attached thereto as hereinabove described, make up what is referred to herein as the tape applying assembly or head.

A hand crank 42 is fixed to the outer shaft 16 to rotate the tape applying crank 15.

In operating the illustrated machine, a roll 25 of normally tacky pressure-sensitive adhesive tape 30 is mounted on the drum 23. The article 12 to be taped, shown in Figure 1 as a small bunch or "hand" of bananas, is placed on the trays 13a and 13b, each end of the bunch resting on one of the two trays, respectively, leaving the central portion of the bunch exposed so that the tape 30 may be applied to it around its entire circumference when the head moves in a circular orbit around the bunch.

The parts of the apparatus are then turned to the position shown in Figure 5. Tape is then manually withdrawn from the roll 25 and the leading end of the withdrawn unsevered length is manually adhered to the surface of the article or bunch 12, as shown in Figures 1 and 5. The hand crank 42 is then turned to move the tape applying head counterclockwise through a circular orbit (Figure 6).

When the parts have reached the position shown in Figure 6, tape will have been applied to the article 12 for the entire distance around its circumference. Further turning then brings the trigger arm 36 into engagement with the cam 37, thereby rotating the cutting arm 27 clockwise around the axis of the shaft 22 in a cutting and wiping stroke. When, in the course of the stroke, the knife 28 bears against the non-tacky side of the tape 30, the tacky side of the tape is pressed against the tape holding member 32 whereupon the knife cuts the tape

(Figure 7). The unsevered portion of the withdrawn length of tape that extends downwardly from the tape roll 25 remains adhered to the tape holding member 32 at a point near its leading end in readiness for manual grasping when a succeeding article is to be taped.

As the stroke continues, the finger 33 presses or "wipes" down the trailing end of the severed length of tape that encircles the article 12, thus completing the tape applying operation (Figure 8).

Figure 9 shows the arm 27 at the end of its cutting and wiping stroke.

Further turning of the hand crank 42 moves the end of the trigger arm past the cam 37 and out of engagement therewith, whereupon the spring 38 turns the cutting arm 27 counterclockwise around the axis of the shaft 22 through its return stroke until the stop 41 on the arm 40 engages the crank 15.

The cycle has then been completed, the turning of the hand crank 42 is stopped and the parts are in their normal starting position shown in Figures 1 and 5.

It will be seen that the attachment of the second tray 13b to the frame at a point on the axis of the tape applying crank 15 permits clearance for a full 360° rotation of the crank and of the tape applying head, to encircle and apply tape around the central portion of an article that is supported at both ends.

It will also be seen that the fundamentals are a movement of a tape applying head having tape roll mounting means and severing means, in a planar orbit determined by the planar extent of a mounted roll of tape, the article being held within the orbit with the portion of the article to be taped exposed and with the said exposed portion intersected by the plane of the orbit, together with automatic actuation of the severing means when a given length of tape has been applied.

In the illustrated machine, the power for driving the cutting and wiping mechanism is supplied by the orbital movement of the head.

The article need not be in the center of the orbit of movement of the tape roll. It is preferred however, that the center of the orbit lie within the article, preferably at or near the center of the portion of the article to be taped. For example, in the illustrated machine, it is preferred that the axis about which the tape applying crank 15 rotates, coincide or nearly coincide with the axis of the article 12.

Apparatus other than that described and shown, and numerous alternatives, equivalents and variations, all within the scope of the invention as described and/or claimed herein, may of course be devised.

We claim:

1. An apparatus for applying a length of tape around an article comprising a frame, a tape applying crank mounted in the frame for rotation about an axis, a tape applying head attached to the crank in spaced relation to the crank's axis, the head having tape roll mounting means and severing means, and the head being positioned with the planar extent of a mounted roll of tape determined by the plane of the circular orbit of the roll as the crank moves the head around the crank's axis, means attached to the frame for supporting the article within the orbit with the portion of the article to be taped exposed and with the said exposed portion intersected by the plane of the orbit, a trigger means on the head for actuating the severing means, and cam means on the frame positioned to engage the trigger means when a given length of tape has been applied.

2. An apparatus for applying a length of tape around an article comprising a frame, a tape applying crank mounted in the frame for rotation about an axis, a tape

applying head attached to the crank in spaced relation to the crank's axis, the head having tape roll mounting means and severing and wiping means, and the head being positioned with the planar extent of a mounted roll of tape determined by the plane of the circular orbit of the roll as the crank moves the head around the crank's axis, means attached to the frame for supporting the article within the orbit with the portion of the article to be taped exposed and with the said exposed portion intersected by the plane of the orbit, a trigger means on the head for actuating the severing and wiping means, and cam means on the frame positioned to engage the trigger means when a given length of tape has been applied.

3. An apparatus according to claim 2 wherein the article supporting means comprises a first tray attached to the frame for supporting one end of the article and a second tray in spaced relation to the first tray for supporting the other end of the article, the second tray being attached to the frame at a point on the axis of rotation of the crank.

4. An apparatus for applying a length of tape around an article comprising a frame, means attached to the frame for supporting the article with the portion of the article to be taped exposed, a tape applying crank mounted in the frame for rotation about an axis, a tape roll shaft fixed to the crank in spaced relation to the crank's axis, the shaft and the crank's axis being parallel, means for rotatably mounting a supply roll of tape on the shaft in spaced relation to the crank and in alignment with the said exposed portion of the article, a rotatable collar on the shaft between the tape roll holding means and the crank, a radially extending cutting arm fixed to the collar, a knife on the cutting arm positioned to engage one side of a withdrawn length of tape that extends from the tape roll to the supported article when the arm is moved through a cutting stroke, a radially extending tape holding arm fixed to the shaft and having a tape holding member positioned to engage the opposite side of the said withdrawn length at a point adjacent the point engaged by the knife, a tape wiping finger on the cutting arm positioned to press the trailing end portion of the severed withdrawn length of tape against the article as the cutting arm continues its stroke, a radially extending trigger arm fixed to the collar, cam means on the frame positioned to engage the trigger arm and thereby to move the cutting arm through the cutting and wiping stroke, spring means for returning the cutting arm to a normal position, and a stop for holding the cutting arm in its normal position against the impulse of the spring.

5. An apparatus according to claim 3 wherein the crank is mounted in the frame by means of a crank shaft that is journaled in the frame and to which the crank is fixed, the crank shaft containing a smaller shaft, the crank shaft and the smaller shaft being concentric and rotatable in respect to each other; and wherein the article supporting means comprises a first tray attached to the frame for supporting one end of the article and a second tray in spaced relation to the first tray for supporting the other end of the article, the second tray being attached to the said smaller shaft.

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