June 1, 1971 M. E. HARBOUR 3,582,438

TAPE HANDLING TOOL

Filed Nov. 4, 1968 5 Sheets-Sheet 1

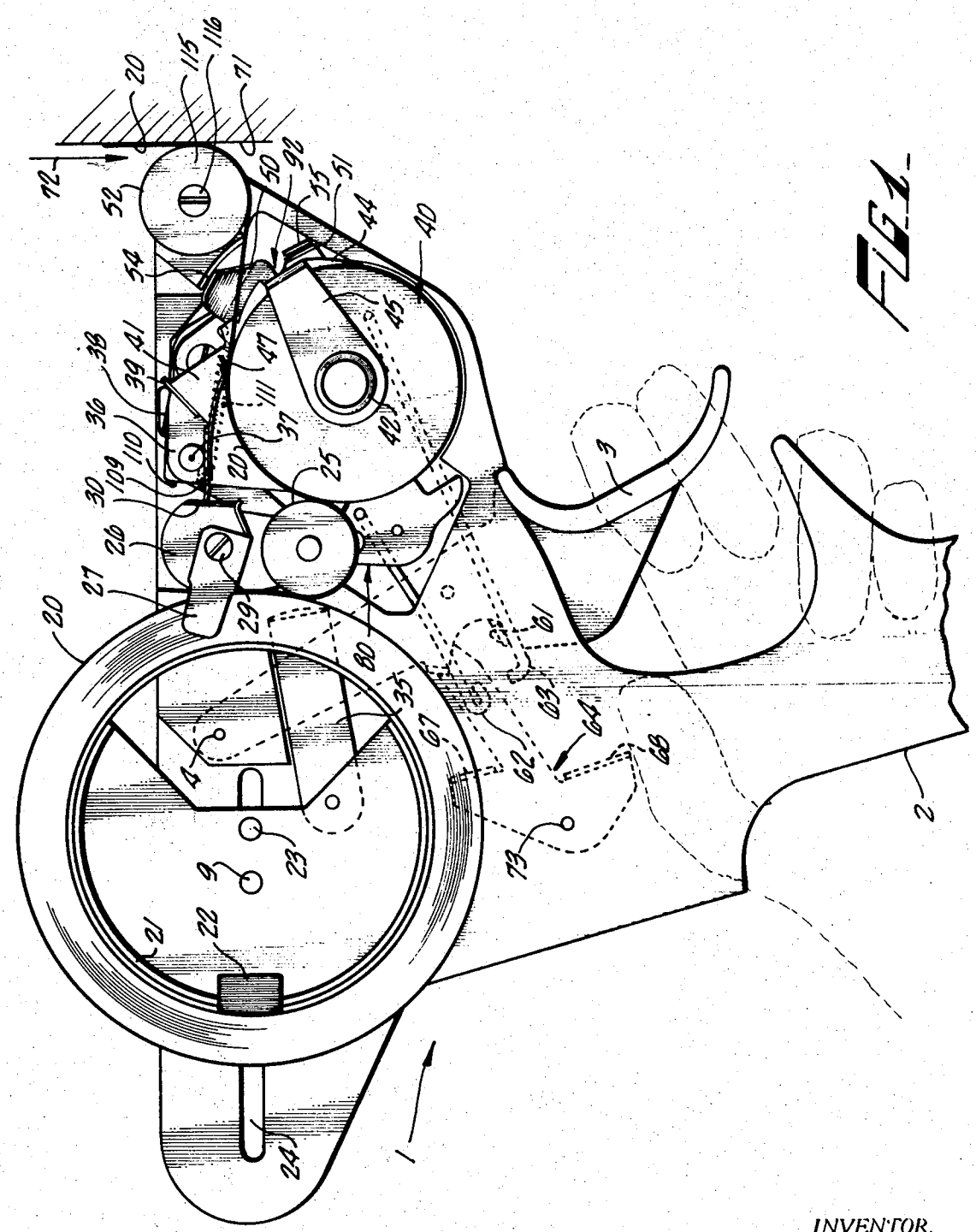


FIG. 1

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TAPE HANDLING TOOL

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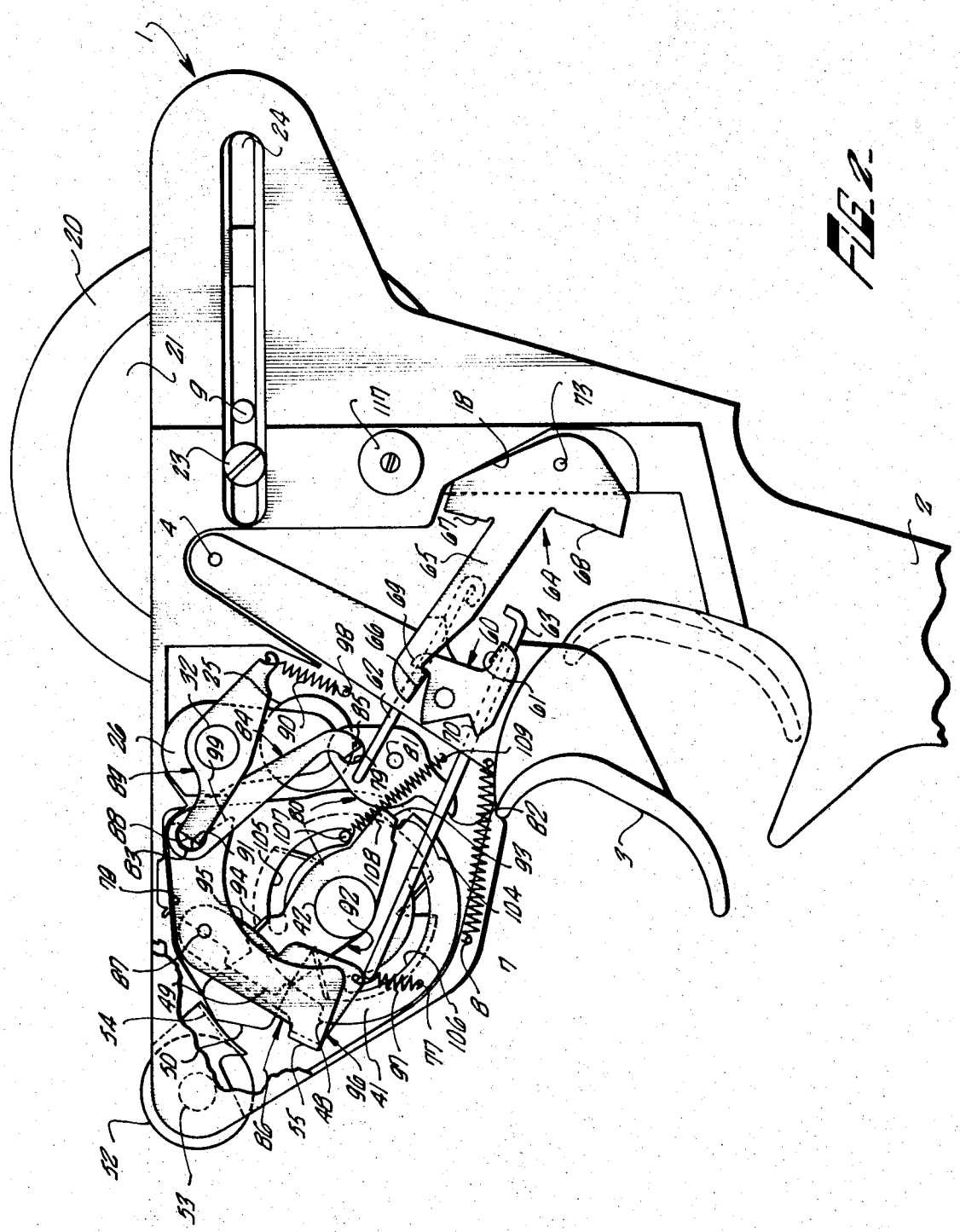


FIG 2

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TAPE HANDLING TOOL

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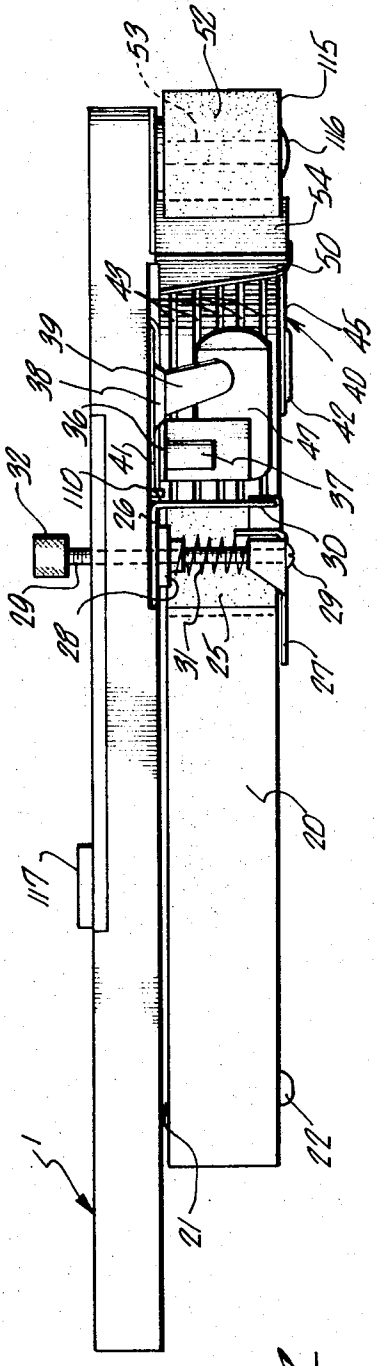


FIG 5

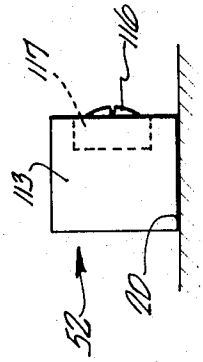


FIG 9B

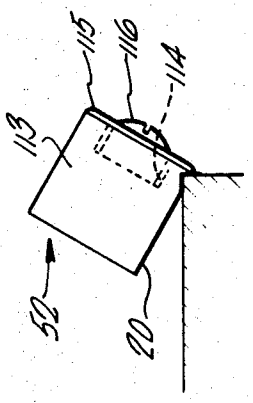


FIG 9A

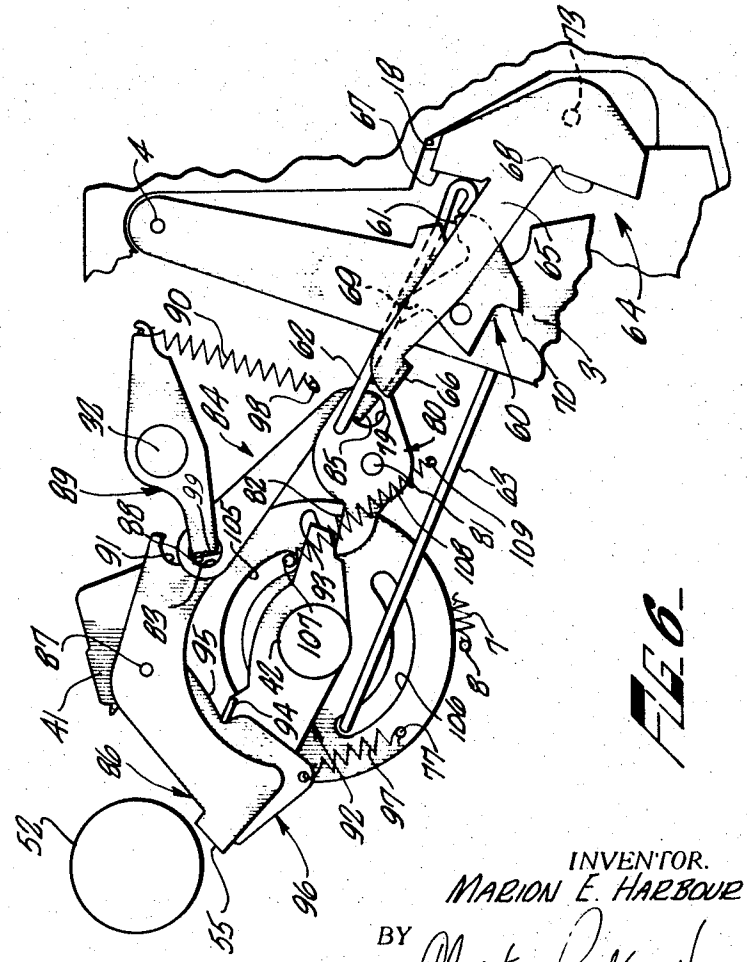


FIG 6

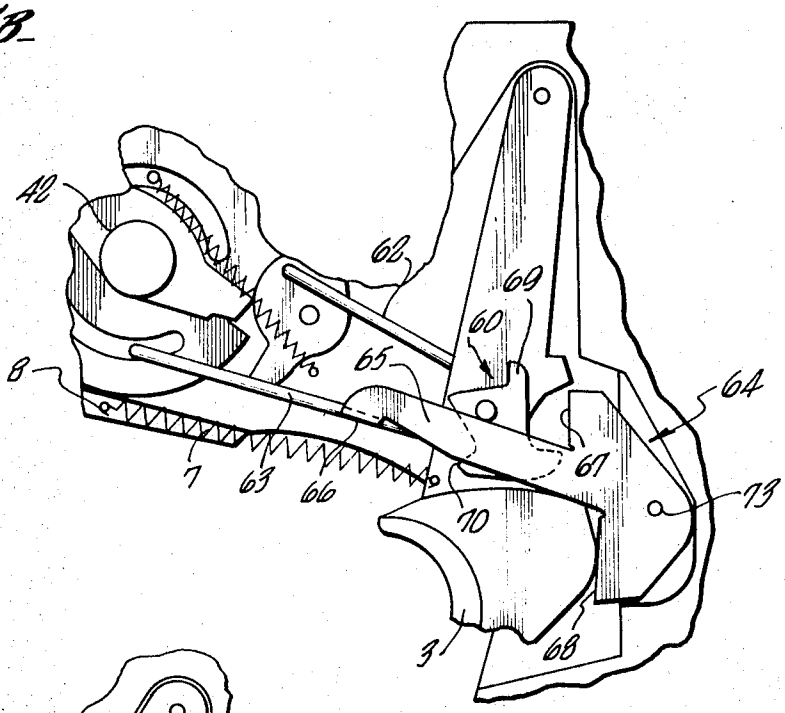
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TAPE HANDLING TOOL

Filed Nov. 4, 1968 5 Sheets-Sheet 4

FIG. 5B



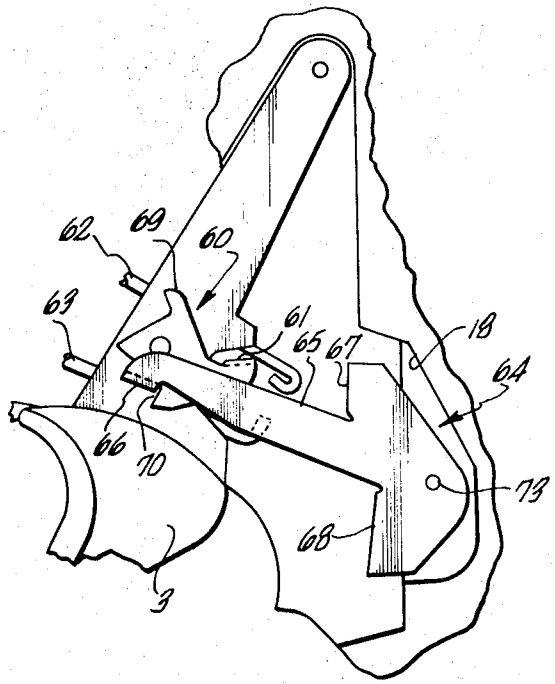


FIG. 5A

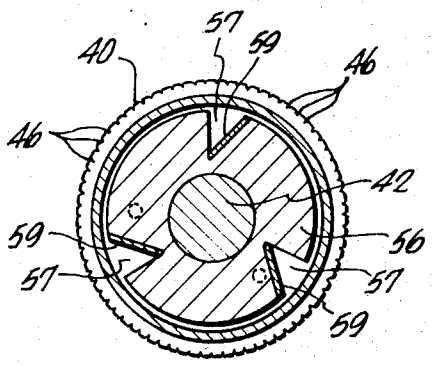


FIG. 4

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TAPE HANDLING TOOL

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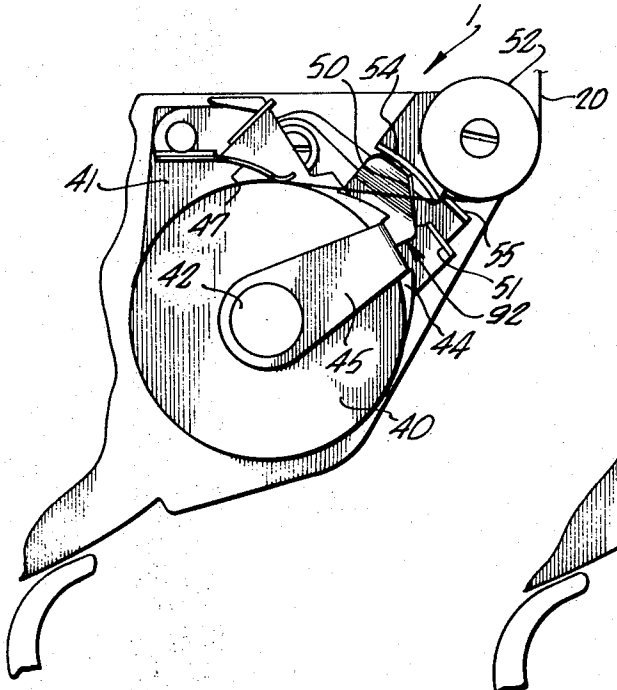


FIG. 7A

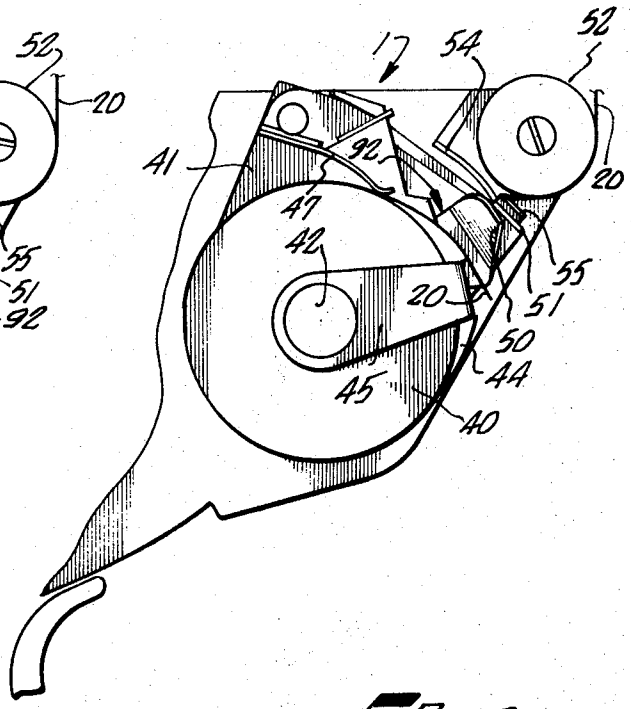


FIG. 7B

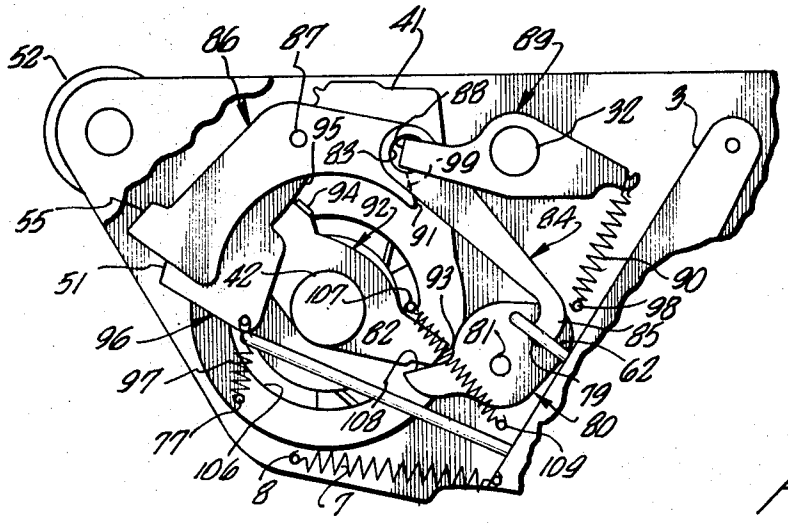


FIG. 8

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United States Patent Office 3,582,438 Patented June 1, 1971

3,582,438

TAPE HANDLING TOOL

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Filed Nov. 4, 1968, Ser. No. 773,168
Int. Cl. B32b 31/20; B44c 7/02
U.S. Cl. 156—523 25 Claims

ABSTRACT OF THE DISCLOSURE

A hand-held tool capable of either applying or dispensing tape. When a trigger is pulled as far as possible by the user, it actuates a cutting mechanism and a tape dispensing mechanism on alternate excursions. By pulling the trigger only part way, the dispensing operation can be repeated indefinitely without intervention of the cutting operation. The trigger has a rotatable dog, the position of which determines which mechanism the trigger actuates when it is pulled. An alternator that is controlled by movement of the trigger changes the position of the dog. The cutting mechanism comprises two movable blades, means for moving the tape away from the blades as it is cut, and a brake all actuated by the trigger. The brake creates a drag on the tape so it can be tensioned. The tape is threaded between an idler roller and a payout wheel. A hub for rotatably supporting a tape roll is translatable in the direction of the idler roller, and the lateral position of the tape roll on the hub is adjustable. The pressure roller has a cavity at one end. Either a slug that fits snugly into the cavity or a disc having the same diameter as the pressure roller can be mounted at the end of the roller.

BACKGROUND OF THE INVENTION

This invention relates to the handling of adhesive tape and more particularly to a tool for applying and dispensing adhesive tape.

Adhesive tape handling tools basically fall into one of two categories, tape applicators or tape dispensers. A tape applicator is actually used to apply tape from a tape roll to a surface, and a tape dispenser is simply used to supply a length of tape from a tape roll. In order to perform both functions, applying and dispensing tape, separate tools are ordinarily needed.

In conventional tape applicators, the tape is pressed between the surface to be covered and a freely rotatable pressure roller while it is being applied. As the pressure roller is drawn across the surface to be covered by the user of the tool, it pulls tape from the tape roll and exerts pressure on the tape as it moves into contact with the surface. The pressure roller is usually a solid cylinder made from a resilient material that conforms to slight irregularities in the surface so force is exerted on the tape evenly during application to the surface to be covered. E. H. Scheifer Pat. 2,932,421, issued Apr. 12, 1960, discloses a tape applicator in which a disc shaped guide is mounted on the end of the pressure roller. The guide has a larger diameter than the pressure roller. Therefore, as the guide is placed against the edge of a corner and is urged into this position while the applicator is moved along the corner, the tape is applied so the longitudinal edge of the tape coincides precisely with the edge of the corner. Unfortunately, the applicator disclosed in the Scheifer patent is not suitable for applying tape to surfaces that are not at a corner since the guide permanently protrudes from the surface of the pressure roller. Accordingly, separate tools are required to apply tape along a corner and to apply tape to a flat surface removed from a corner.

Both tape applicators and tape dispensers are generally provided with a cutting mechanism to sever the applied or dispensed tape from the tape roll in the tool. The known

cutting mechanisms take many different forms. The simplest form of cutting mechanism is a single, stationary, serrated blade across which the user of the tool pulls the tape to sever it. More sophisticated cutting mechanisms take the form of a movable blade that sweeps across the tape to sever it responsive to an actuating element mechanism operated by the user. For the sake of safety, the movable blade is arranged in the tool so that it does not protrude as it travels through its cutting path. As a result, the tape is cut at an inaccessible spot in the tool where the new end of the tape on the roll is formed. In order to make the new end of the tape accessible to a pressure roller or the user's hands, it has been found necessary to provide a mechanism to pay out from the roll in the tool a measured length of tape after the cutting operation. In other words, two stages of operation are required, a cutting stage and a tape dispensing stage. J. T. Auldt et al. Pat. 3,390,041, issued June 25, 1968, discloses a tape tool that possesses a cutting and a dispensing stage. The cutting stage is initiated by pulling a trigger to release a spring loaded blade. The blade is reloaded by rotating a lever that also causes a length of tape to be dispensed sufficient to place the new end of the tape adjacent the pressure roller. Since the two stages of operation are initiated by two separate actuating elements, namely a trigger and a reloading lever, both hands of the user are required to operate this tool. The trigger is actuated by one hand and the reloading lever is actuated by the other hand.

SUMMARY OF THE INVENTION

The invention contemplates a tape handling tool in which a tape cutting mechanism and a tape dispensing mechanism are both operated by a single actuating element. This results in a convenient tool to use because only one hand of the user is required. Most advantageously, the parts of the tool are mounted on a pistol shaped frame that has a hand grip, and the actuating element is a trigger adapted to be pulled by the fingers of the user's hand on the grip.

Specifically, the tape cutting mechanism is operated responsive to the movement of a first linkage and the tape dispensing mechanism is operated responsive to the movement of a second linkage. The first and second linkages are individually connected to the actuating element on alternate excursions of the actuating element away from its rest position. Such an arrangement permits the tool to be utilized as a tape dispenser capable of applying any length of tape, as well as a tape applicator. The second linkage remains connected to the actuating element until the actuating element is moved away from the rest position as far as possible. Consequently, by repeatedly moving the actuating element away from the rest position only as far as an intermediate position, more and more tape is dispensed without reconnecting the first linkage to the actuating element. Then when the actuating element is pulled as far as possible, the connection to the first linkage is reestablished.

The first and second linkages are individual connected to the actuating element by a movable dog on the actuating element that assumes one of two positions. In the first position, the dog engages the first linkage, and in the second position, the dog engages the second linkage. An alternator that is controlled by movement of the actuating element changes the position of the dog each time the actuating element is pulled as far as possible.

The cutting mechanism preferably comprises two movable blandes and means for moving the tape between the roll and the blades away from the blades as it is cut. In connection with the cutting stage, a brake is also operated responsive to the actuating element prior to the movement of the blades. The brake creates a drag on the tape by

forming a bend in the tape path so no further tape can be pulled off the roll.

The tape applying pressure roller has a cavity at one end. A disc having the same diameter as the pressure roller is removably mounted at the end of the roller. Because of the cavity, the surface of the roller adjacent to the disc can be flattened so that the disc protrudes. As a result, the roller with the disc can be employed to cover a surface at a corner as well as a surface away from a corner. The lateral position of the tape roll on its supporting hub is adjustable to make the longitudinal edge of the tape passing over the pressure roller coincide with the edge of the disc or extend laterally over it so the pressure roller does not exert pressure on a small part of the tape. A slug is also provided that fits snugly into the cavity. When the disc is replaced by the slug, the roller is more suitable for continual use away from corners.

A feature of the invention is the automatic adjustment of the position of the tape roll as it is depleted. The tape is threaded between an idler roller located near the center of gravity of the tool and a payout wheel, and the tape roll is rotatably supported on a hub that is translatable in the direction of the idler roller. Thus, as tape is pulled from the tool, the tape roll is urged against the idler roller so the tool remains well balanced at all times and can accommodate tape rolls with a wide range of diameters.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of a specific embodiment of the best mode contemplated of carrying out the invention are illustrated in the drawings, in which:

FIG. 1 is a right side elevation view of a tape handling tool, including a frame that is depicted as transparent for the purposes of illustrating the parts;

FIG. 2 is a left side elevation view of the tape handling tool of FIG. 1;

FIG. 3 is a top plan view of the tape handling tool of FIG. 1;

FIG. 4 is a right side elevation view in section of the payout wheel of the tape handling tool of FIG. 1;

FIGS. 5A and 5B are left side elevation views of the connection between the trigger and the cutting and dispensing mechanisms during different points in the stages of operation of the tool of FIG. 1;

FIG. 6 is a left side elevation view of the connection between the trigger and the cutting and dispensing mechanisms, as well as the mechanisms themselves, at a point in one of the stages;

FIGS. 7A and 7B are right side elevation views of the cutting mechanism at different points in the cutting stage;

FIG. 8 is a left side elevation view of the cutting mechanism at a point in the cutting stage; and

FIGS. 9A and 9B are views of the tape applying pressure roller of the tool of FIG. 1 having, respectively, a disc and a slug mounted on the end with the cavity.

DESCRIPTION OF A SPECIFIC EMBODIMENT

Reference is made to FIGS. 1 and 2 in which a tape handling tool is shown that can be used as a tape applicator or as a tape dispenser. The parts of the tool are supported by a pistol-shaped frame **1** that has a grip **2** designed for the hand of the tool user. A trigger **3** is pivotably mounted on frame **1** by a pin **4** so it can be pulled by the fingers of the user while his hand holds grip **2**. In other words, trigger **3** is in forefinger relationship with hand grip **2**. Trigger **3**, which serves as an actuating element for the tool, reciprocates between the positions indicated in FIG. 2 by the solid and dashed representations thereof. A compression spring **7** is connected between a stationary pin **8** and trigger **3** to bias it into the position indicated by the solid representation. When the user pulls trigger **3**, overcoming spring **7**, trigger **3** moves toward the position indicated by the dashed representation.

A roll of pressure sensitive adhesive tape **20** is supported on a hub **21**. An integral flanged arm **22** on hub **21** retains the tape roll on hub **21**. Hub **21** is attached to frame **1** by a screw **23** whose shank rides in a slot **24** in frame **1**. Thus, hub **21** is translationally movable to accommodate a wide range of diameters of tape rolls. A pin **9** on hub **21** also rides in slot **24** to prevent rotation of hub **21**.

An idler roller **25** is rotatably mounted on a plate **26** near the center of gravity of the tool. A spring keeper **28** is fixed to frame **1**. Plate **26** is clamped loosely between keeper **28** and frame **1**, so roller **25** is capable of moving transverse to its axis of rotation. A clamp **27** for the tape roll is pressed against the head of an adjusting screw **29** by a tension spring **31**. Screw **29** extends through spring **31** and a threaded opening in keeper **28** to the other side of frame **1**, where a knob **32** is fixed to it. Spring **31** is held between keeper **28** and clamp **27**. When knob **32** is turned, screw **29** moves axially by virtue of its threaded fitting with keeper **28**. As a result, the distance between clamp **27** and frame **1** is adjusted to accommodate tape rolls having different widths and to change the lateral position of the tape in the tool. A transverse extension **30** of plate **26** serves as a stop on the rotation of clamp **27** in a counterclockwise direction, as viewed in FIG. 1. A leave spring **35** mounted on frame **1** and located between frame **1** and the tape roll urges the tape roll against clamp **27**, thereby positively determining the lateral position of tape **20** as it leaves the tape roll.

A tape payout wheel **40** and a plate **41** are rotatably mounted on a shaft **42** that is secured to frame **1**. As discussed in detail below in connection with FIG. 4, the payout wheel is free to rotate only in one direction (clockwise as viewed in FIG. 1), except when it moves together with plate **41**. A spring **111** is connected between plate **41** and a pin **109** fixed to frame **1**. Thus, plate **41** is biased to rest against a pin **110** fixed to frame **1**. Wheel **40** has a plurality of circumfereral grooves **43** in which rakes **44** are set. Rakes **44** are held in place on wheel **40** by a U-shaped bracket **45**, which is attached to shaft **42**. The position of bracket **45** relative to plate **41** is fixed by short bends **48** and **49** in plate **41** between which bracket **45** lies. Transverse splines **46** formed in the surface of wheel **40** provide a knurled surface that prevents the adhesive on tape **20** from sticking too tightly to wheel **40**.

As tape **20** leaves the tape roll it is wrapped around about one-half the circumference of idler roller **25** with the adhesive side facing away from roller **25**. From roller **25**, tape **20** passes over about a quarter of the circumference of wheel **40**, with its adhesive side facing toward wheel **40**. As tape **20** passes over rakes **44**, it is peeled off the surface of wheel **40**. Rakes **44** are contoured to direct tape **20** between cutting blades **50** and **51** and across the surface of a pressure roller **52** with its adhesive side facing away from roller **52**. A spring clip **47** is fixed to a plate **36**, which is rotatably attached to plate **41** by a peg **37**. When the top edge of plate **36** lies under a bend **38** in plate **41**, clip **47** presses tape **20** against wheel **40**. Plate **36** has an integral finger grip **39**. Pressure roller **52** is rotatably mounted on a shaft **53**, which is fixed to frame **1**. A stationary tape handling element **54** is mounted on frame **1** above blade **50** and a movable tape braking element **55** is located above blade **51**.

The tool has two stages of operation that are actuated on alternate reciprocations of trigger **3**—a tape cutting stage and a tape dispensing stage. During the tape cutting stage, brake element **55** is first driven upward by trigger **3** to form with element **54** a bend in the path of tape **20**. Consequently, a drag is created on tape **20** when it is tensioned because the adjacent edges of elements **54** and **55** contact tape **20**. In essence, the edge of element **54** presses the adhesive side of tape **20** against the edge of element **55**, the tool may then be pulled away from the tape already applied without paying out any more tape. This enables the user to tension the tape so it may be cinched tightly around a package or other surface when the tool is being used as a tape applicator. Thereafter,

blades 50 and 51 are driven by trigger 3 across tape 20 in a scissor action to cut it. During the tape dispensing stage, wheel 40 is driven by trigger 3, thereby pulling tape off the tape roll and dispensing it from the tool.

In using the tool as a tape applicator, the user lays pressure roller 52 on a surface 71 to which tape is to be applied and moves the tool by rolling roller 52 along surface 71 in the direction of an arrow 72 without actuating trigger 3. Consequently, tape 20, which lies between surface 71 and roller 52, is pulled from the tape roll. As tape 20 is pulled from the tape roll, it forces the tape roll firmly against roller 25, and roller 25 firmly against wheel 40. The tape roll rotates on hub 21 in a clockwise direction in substantially non-slipping engagement with roller 25; roller 25 rotates in a counterclockwise direction in substantially non-slipping engagement with wheel 40; and wheel 40 rotates in a clockwise direction, all as viewed in FIG. 1. It is to be noted that hub 21 is pulled to the right, as viewed in FIG. 1, against idler roller 25 as the tape roll becomes smaller in diameter. Therefore, the weight of the tape roll remains near the center of gravity of the tool so it stays well balanced. This makes the tool much easier to hold and maneuver. When the tape is to be cut, trigger 3 is pulled while the tool is in the cutting stage. This cuts the tape and places the tool in the dispensing stage. Then trigger 3 is pulled again, to drive the new end of tape 20 formed by the cutting operation out of the tool and under roller 52, where it can be applied to a surface. This places the tool back in the cutting stage so it is ready to cut tape 20 once again after it is applied.

In using the tool as a tape dispenser, trigger 3 is only pulled part way to an intermediate point while it is in the dispensing stage. In this way, the dispensing stage can be repeated indefinitely without intervention of the cutting stage. Any desired amount of tape can be driven out of the tool by repeatedly pulling trigger 3 to the intermediate position. When enough tape is dispensed, the tool is placed in the cutting stage by pulling trigger 3 as far as possible.

All the parts of the tool mentioned so far are situated external of frame 1. The remainder of the parts, which are discussed below, are situated inside of frame 1.

The stage in which the tool is operating is determined by the position of a dog 60 (FIG. 2) pivotably mounted on triggger 3. Dog 60 has a transverse shoulder 61 that engages the bent over end of a linkage rod 62 in the cutting stage and engages the bent over end of a linkage rod 63 in the dispensing stage. As trigger 3 is pulled, the rod (62 or 63) that shoulder 61 engages is also pulled by dog 60 to execute the operation of the stage. An alternator 64, which controls the position of dog 60, is pivotably mounted on frame 1 by a pin 73. Dog 60, which is eccentric, is mounted so it does not pivot under the force of gravity; it can only be moved by alternator 64. This could be accomplished by providing a relatively large amount of friction in the pivotable mounting of dog 60. Alternator 64 has an arm 65 with a transverse shoulder 66 formed at its end and has transverse shoulders 67 and 68 formed at either side of arm 65. Shoulder 67 protrudes into the path of movement of rod 62 when the tool is in the cutting stage. FIG. 5A represents the parts in the cutting stage before trigger 3 is pulled. As trigger 3 is pulled as far as possible, the end of rod 62 is pushed against shoulder 67, and alternator 64 pivots in a clockwise direction, as viewed in FIG. 2, so shoulder 68 protrudes into the path of movement of trigger 3. FIG. 6 represents the parts in the cutting stage after trigger 3 is pulled. It should be noted that alternator 64 pivots clockwise until it abuts a surface 18 on the inside of frame 1. Surface 18 prevents trigger 3 from being pulled completely to its stop position, indicated by dashed lines in FIG. 1, in the cutting stage. Upon the return of trigger 3 to its normal position after alternator 64 is pivoted clockwise, shoulder 66 hooks an ear 69 on dog 60 and rotates dog 60 in a clockwise direction, as viewed in FIG. 2, so shoulder 61 is ready to engage rod 63 when trigger 3 is pulled the next time. At this point the tool is in the dispensing stage, which is represented in FIG. 2 before trigger 3 is pulled. As trigger 3 is pulled to its stop position, it pushes against shoulder 68 and alternator 64 pivots in a counterclockwise direction, as viewed in FIG. 2, so shoulder 67 again protrudes into the path of movement of trigger 3. FIG. 5B represents the parts in the dispensing stage after trigger 3 is pulled. Upon the return of trigger 3 to its normal position after alternator 64 pivots counterclockwise, shoulder 66 catches an ear 70 on dog 60 and rotates dog 60 in a counterclockwise direction, as viewed in FIG. 2, so shoulder 61 is ready to engage rod 62 again. At this point in the operation, the parts are back in the cutting stage represented in FIG. 5A. To summarize, the described parts repeatedly return to the same relative positions every other time trigger 3 is pulled as far as possible.

The dispensing stage can be repeated indefinitely without intervention of the cutting stage by pulling trigger 3 only far enough to abut shoulder 68, but not far enough to cause alternator 64 to pivot. The user can easily feel when this point is reached. Thus, shoulder 68 does not catch ear 70, and dog 60 stays in the position for the cutting stage.

When dog 60 is positioned for the cutting stage, trigger 3 is mechanically coupled through rod 62 to blades 50 and and 51 and to brake 55. Specifically, the opposite end of rod 62 from the end engaged by shoulder 61 fits into a hole through a bellcrank 80. Bellcrank 80 is pivotably supported by a shaft 81 mounted on frame 1. As trigger 3 is pulled, an ear 82 on bellcrank 80 establishes a mechanical linkage to plate 41 and blades 50 and 51, while a hole 79 through bellcrank 80 establishes a mechanical linkage to brake 55. A connecting linkage 84 has a transverse extension 85 on one end that fits into hole 79 and a hole 83 on the other end. A connecting linkage 86, which is integral with brake 55, is pivotably supported by a shaft 87 mounted on frame 1. Linkage 86 has a slot 91 at the opposite end from brake 55. A transverse extension 88 of a bellcrank 89 fits into slot 91. Bellcrank 89 is pivotably mounted on a shaft (not shown) coaxial with screw 29. A compression spring 90 is connected between bellcrank 89 and a pin 98 fixed to frame 1. Spring 90 biases bellcrank 89 in a clockwise direction, is viewed in FIG. 2. Linkage 84 is disposed laterally between linkage 86 and bellcrank 89 so extension 88 fits through hole 83. As a result, spring 90 also biases linkages 84 and 86 so they abut a surface 78 inside of frame 1. Blade 50, which is integral with a connecting linkage 92, extends transversely from one end thereof. Transverse extension 93 is formed at the other end of linkage 92. Linkage 92 is pivotably supported by shaft 42. A transverse extension 94 on linkage 92 engages a cam surface 95 on a connecting linkage 96 that is also pivotably supported by shaft 81. Blade 51 is integral with linkage 96 and extends transversely therefrom. A compression spring 97 is connected between linkage 96 and a pin 77 fixed to frame 1. Spring 97 biases linkage 96 in a counterclockwise direction, as viewed in FIG. 2, so extension 94 bears against surface 95 at all times.

As shown in FIG. 4, wheel 40 is a hollow cylinder inside of which an annular drum 56 is disposed. Drum 56 has notches 57 in its outer cylindrical surface. One side of each of notches 57 lies in a radial plane of drum 56. The radial sides of notches 57 are oriented counterclockwise of the non-radial sides, as viewed in FIG. 1. Flat pawls 59 are located in notches 57 against the non-radial sides, as illustrated in FIG. 4. They are slightly shorter than the non-radial sides, but longer than the radial sides. As a result, wheel 40 can rotate clockwise with respect to drum 56, as viewed in FIG. 1, without interference from pawls 59, but when counterclockwise rotation of wheel 40 with respect to drum 56 is attempted, pawls 59

tend to pivot counterclockwise, moving outward from the cylindrical surface of drum **56** against the inner surface of wheel **40** so no relative rotation can take place. In other words, pawls **59** permit relative rotation between drum **56** and wheel **40** in only one direction.

Extension **93** of linkage **92** lies within a slot **104** (FIG. 2) in plate **41**. Plate **41** also has arcuate slots **105** and **106**. A post **107**, which is fixed to drum **56**, extends through slot **105**. A compression spring **108** is connected between post **107** and a pin **109** fixed to frame **1**. Thus, spring **108** biases post **107** against the right extremity of slot **105**, as viewed in FIG. 2. The end of rod **63** opposite the end that engages shoulder **61** of dog **60** fits into a hole in drum **56** so trigger **3** is mechanically coupled to wheel **40**, when dog **60** is positioned for the cutting stage.

The parts participating in the cutting operation are depicted in FIGS. 1 and 2 in their relative positions before trigger **3** is pulled. When trigger **3** is pulled, while dog **60** is positioned for the cutting stage (FIG. 5A), bellcrank **80** is rotated by rod **62** in a clockwise direction, as viewed in FIG. 2. Bellcrank **80** rotates a short distance to the position illustrated in FIG. 8 before ear **82** engages extension **93** of linkage **92**. This increment of rotation of bellcrank **80** is coupled through linkages **84** and **86** to brake **55**. Consequently, brake **55** moves upward to push tape **20** toward roller **52**, as depicted in FIG. 7A, thereby forming with tape handling element **54** a slight bend in tape **20** near blades **50** and **51**. Consequently, a drag or resistance is developed that inhibits any further payout of tape as the tool is pulled away from the tape already applied. After ear **82** engages extension **93**, linkage **92** and blade **50** are driven in a counterclockwise direction, as viewed in FIG. 2, and linkage **86** stops moving because extension **88** engages a straight portion **99** of slot **91**. The angle of inclination of portion **99** is chosen so element **55** remains stationary while blades **50** and **51** begin to move. As linkage **92** moves in a counterclockwise direction, extension **94** drives linkage **96** and blade **51** in a clockwise direction, as viewed in FIG. 2. FIG. 6 shows the relative position of these parts when the trigger is pulled as far as possible. Thus, as depicted in FIG. 7B, blades **50** and **51** simultaneously move together across tape **20** in opposite directions to cut it.

Plate **41** is driven with linkage **92** because extension **93** lies in slot **104**. As plate **41** rotates in a counterclockwise direction, as viewed in FIG. 2, it carries drum **56** and wheel **40** with it, because the end of slot **105** bears against post **107** and pawls **59** prevent relative rotation between wheel **40** and drum **56**. Thus, as blades **50** and **51** cut tape **20**, wheel **40** rotates. Spring clip **47** keeps tape **20** on wheel **40** as it rotates so the new end of tape **20** in the tool moves in a clockwise direction, as viewed in FIG. 7B, to a position under blade **50**. This clears the new end of tape **20** from the path of blades **50** and **51** to obviate entanglement of the new end of tape **20** therewith. As trigger **3** is released and blades **50** and **51** return to their initial positions, spring **108** and linkage **92** rotate plate **41** back to its initial position against pin **110**. Drum **56** is carried with plate **41** as it rotates because post **107** is kept against the end of slot **105** by spring **108**. Wheel **40** is carried with plate **41** as it rotates because of spring clip **47**. The new end of tape **20** rotates with wheel **40** to a position where it is aimed toward the space between blade **50** and brake **55** when these parts are in their normal positions, as shown in FIG. 1. Consequently, the new end of tape **20** is ready to be pushed through this space and out of the tool to a point adjacent the surface of roller **52**, which takes place during operation in the dispensing stage. Rakes **44** help to control the direction in which the new end of tape **20** is aimed after it is cut. The contour of rakes **44** is designed with this purpose in mind. As the new end of tape **20** is pushed toward roller **52** during operation in the dispensing stage, element **54** serves to deflect the new end downward away from roller **52**, thereby preventing the adhesive side of tape **20** from sticking against roller **52**.

When trigger **3** is pulled while dog **60** is in the position for the dispensing stage, rod **63** rotates drum **56** in a clockwise direction, as viewed in FIGS. 1 and 4. Pawls **59** engage the inner surface of wheel **40**, so wheel **40** is also driven in a clockwise direction, as viewed in FIG. 4. When trigger **3** is released, spring **108** pulls drum **56** back to its starting position in which post **107** rests against the end of slot **105**; but wheel **40** remains stationary because it is held by spring clip **47** and pawls **59** are not engaged. By repeatedly pulling trigger **3** to the intermediate position, wheel **40** is progressively and incrementally advanced in a clockwise direction, as viewed in FIG. 1, to payout of the tool more and more tape. By pulling trigger **3** as far as possible, a sufficient length of tape is dispensed from the tool to place the new end of tape **20** adjacent to roller **52** so the tape can be applied by roller **52** to a surface.

To load the tool with a roll of tape, hub **21** is first moved as far as possible to the left, as viewed in FIG. 1, clamp **27** is rotated clockwise to a vertical position, and the top edge of plate **36** is taken out from under bend **38** so spring clip **47** can be lifted from wheel **40**. Then, a roll of tape is mounted on hub **21** and the end of the tape is threaded between roller **25** and wheel **40** so the adhesive side of the tape lies on the surface of wheel **40**. Since roller **25** is movable about the axis of screw **29**, it can be pulled away from wheel **40** to facilitate threading of tape **20**. Finally, knob **32** is turned to screw clamp **27** into a horizontal position against the side of the tape roll, and the top edge of plate **36** is placed under bend **38** again so that spring clip **47** holds tape **20** against wheel **40**. At this point teh tool is loaded ad ready for operation. As the user pulls trigger **3** in the dispensing stage, the end of tape **20** is payed out by wheel **40** and hub **21** is pulled to the right, as viewed in FIG. 1, until the tape roll pushes roller **25** up against wheel **40** to balance the tool.

Roller **52** is made from rubber or other resilient material and has a cylindrical cavity **114** at its end facing away from frame **1**. A disc **115** having the same diameter as roller **52** is attached by a screw **116** to the end of roller **52** where cavity **114** is located. A slug **117**, which is attached to frame **1** by a screw **118**, is adapted to fit snugly into cavity **114**. Disc **115** and slug **117** are made from a hard non-resilient material such as plastic. When the user of the tool wants to apply tape to a surface at a corner, the tool is canted and initially placed so disc **115** lies against the corner. Pressure is applied to roller **52** by the user while he draws the tool along the corner. The force exerted on roller **52** depresses slightly the end of roller **52** adjacent to disc **115** because of cavity **114**. Thus, the edge of disc **115** protrudes slightly from the end of roller **52** to function as a guide as the tool is drawn along the corner. FIG. 9A depicts roller **52** while tape **20** is being applied to the corner of a surface. By adjusting the lateral position of tape **20** with knob **32**, the longitudinal edge of tape **20** applied to the surface can be made to extend slightly over the edge of the corner or to coincide precisely with the edge of the corner. This permits precision masking.

In the former case, the portion of tape extending over the edge of the corner is simply pressed down by the user to cover the other surface forming the corner. When the user of the tool wants to apply tape to a flat surface that is not at a corner, screw **116** is taken off, disc **115** is removed, and slug **117** is placed in cavity **114**. Then screw **116** is replaced. Slug **117** fills cavity **114** and provides a solid backing for the hollow portion of cylinder **113** so that uniform pressure may be exerted on tape **20** over its entire width while tape is applied to the surface. FIG. 9B depicts roller **52** while tape **20** is being applied to a flat surface from a corner.

The principles of the invention are also applicable in a tool that handles moisture activated tape. In such case, a

source of moisture would have to be provided in the tape path. It could be a water moistened sponge or pad that is mounted on wheel **40** in place of rakes **44** in the tape path between roller **25** and blade **50**.

What is claimed is:

1. A tape handling tool comprising:
means for rotatably supporting a roll of tape;
a freely rotatable tape applying roller;
a payout element that is freely rotatable about a fixed point;
means for guiding tape in a path from the roll supporting means to the roller such that tape is wrapped around the payout element in non-slipping contact therewith in one direction and can be pulled off of the roll supporting means from a point adjacent the roller;
an actuating element that is movable away from a rest position responsive to applied force;
first and second mechanical linkages;
means responsive to the movement of the first linkage for cutting tape at a point along the tape path between the payout element and the roller;
means responsive to the movement of the second linkage for rotating the payout element in the one direction to dispense tape from the roll supporting means along the tape path, the payout element being rotated far enough that the length of tape dispensed responsive to the movement of the second linkage is at least as great as the distance along the tape path between the point where the tape is cut and the roller; and
means for alternately connecting the actuating element to the first and second linkages so tape is alternately cut and dispensed.

2. The tape handling tool of claim **1**, in which the connecting means comprises a movable dog mounted on the actuating element, the dog engaging the first linkage in a first position and the second linkage in a second position, and an alternator that is movable into a first position responsive to the movement of the actuating element as far as possible while the dog engages the second linkage and movable into a second position responsive to the movement of the actuating element as far as possible while the dog engages the first linkage, the alternator being adapted in its first position to move the dog to its first position upon the return of the actuating element to its rest position, and the alternator being adapted in its second position to move the dog to its second position upon the return of the actuating element to its rest position.

3. The tape handling tool of claim **1**, in which means responsive to the movement of the first linkage are provided for creating a drag on the tape prior to cutting it.

4. The tape handling tool of claim **3**, in which the means for creating a drag on the tape comprises a pivotable brake disposed on the other side of the tape path from the tape applying roller, the brake rotating toward the tape applying roller responsive to the movement of the first linkage to form a bend in the tape path with the tape applying roller.

5. The tool of claim **1**, in which means responsive to the movement of the first linkage are provided for moving the tape in the tape path between the tape support means and the cutting means away from the cutting means as the tape is cut.

6. The tape handling tool of claim **5**, in which the means for cutting tape comprises two blades that are normally spaced apart on opposite sides of the tape path, the blades move across the tape in a scissor action to cut it responsive to the movement of the first linkage, and the tape is returned after is is cut to a point where the new end of the tape is positioned between the blades in their normal spaced apart position.

7. The tape handling tool of claim **1**, in which the first and second linkages are independently movable and the connecting means comprises means for individually connecting the actuating element to the first and second linkages on alternate excursions of the actuating element away from the rest position.

8. The tape handling tool of claim **7**, in which the elements are mounted on a pistol-shaped frame having a hand grip and the actuating element comprises a trigger disposed on the frame in forefinger relationship with the hand grip.

9. The tape handling tool of claim **8**, in which the roll supporting means is mounted on the frame so it is translatable in the direction of the center of gravity of the tool and the tape guiding means is oriented so the roll supporting means moves toward the center of gravity of the tool as tape is pulled off the roll supporting means from a point adjacent the roller.

10. The tape handling tool of claim **1**, additionally comprising means for adjusting the lateral position of a roll of tape on the roll supporting means so as to vary the lateral position of the tape path between the roll supporting means and the applying roller.

11. The tape handling tool of claim **1**, in which the tape guiding means establishes a substantially fixed tape path and the cutting means comprises first and second blades normally spaced apart on both sides of the tape path, both blades being driven across the tape in a scissors action to cut the tape responsive to the movement of the first linkage.

12. The tape handling tool of claim **1**, additionally comprising a plurality of rakes mounted on the payout wheel, the rakes being shaped and disposed to lift tape off the payout wheel when the payout wheel rotates responsive to the movement of the second linkage.

13. A tape applicator comprising:
a rotatable applicator roller;
means for rotatably supporting a roll of tape;
means for guiding tape in a path from the supporting means to a point adjacent the roller;
a lateral stop that is adjustable in a direction parallel to the axis of a roll of tape on the supporting means; and
means for urging a roll of tape on the supporting means against the stop to align with the lateral stop one edge of tape extending from the roll.

14. The tape applicator of claim **13**, in which the guiding means includes a rotatable payout wheel disposed in the tape path so tape is wrapped around the payout wheel in non-slipping contact therewith.

15. A tape handling tool comprising:
means for rotatably supporting a roll of tape;
means for guiding tape in a path from the roll supporting means to the exit of the tool such that tape can be pulled off of the roll supporting means from a point adjacent the exit;
an actuating element that is movable away from a rest position responsive to applied force and returnable to the rest position responsive to a spring force;
an operation determining mechanism that assumes alternatively first and second stages;
means responsive to the movement of the actuating element away from the rest position when the mechanism is in the first stage for cutting tape at a point along the tape path and for placing the mechanism in the second stage;
means responsive to the complete movement of the actuating element away from the rest position when the mechanism is in the second stage for dispensing tape along the tape path and for placing the mechanism in the first stage; and
means responsive to the partial movement of the actuating element away from the rest position when the mechanism is in the second stage for dispensing tape along the tape path without placing the mechanism in the first stage.

16. In a tape applicator having a tape cutting mechanism and a tape braking mechanism that creates a drag on the tape, the improvement comprising:
an actuating element movable away from a rest position to an operating position;
means for connecting the actuating element to the cutting mechanism so the cutting mechanism operates as the actuating element moves to its operating position; and
means for connecting the actuating element to the braking mechanism as the actuating element moves to an intermediate position between the rest position and the operating position so the braking mechanism operates prior to the operation of the cutting mechanism, the connecting means moving while the actuating element moves from the rest position to the intermediate position and remaining stationary while the actuating elements moves from the intermediate position to the operating position.

17. In an applicator for pressure sensitive tape having a cutting mechanism and a braking mechanism that creates a drag on the tape prior to cutting it, the improvement which comprises creating a drag on the tape by forming a bend in the tape path with the adjacent surfaces of a pair of tape elements such that as the tape is pulled from the applicator the surfaces press the tape against each other, one of the elements being fixed and the other element being movable toward the fixed element as the brake is actuated.

18. The tape applicator of claim 17, in which the fixed element comprises a rotatable applicator roller for applying tape to a surface to be covered, the applicator additionally having means for supporting a roll of tape and means for guiding tape from the roll supporting means to the applicator roller in a tape path that passes the cutting mechanism and the movable element such that the movable element lies between the cutting mechanism and the applicator roller.

19. The tape applicator of claim 17, in which the fixed element comprises a stationary tape guide located on the opposite side of the tape from the movable element.

20. A tape handling tool comprising means for supporting a roll of tape, a payout wheel, an applicator roller, means for guiding tape from the roll along a substantially fixed tape path across the payout wheel in non-slipping contact therewith to the applicator roller, an actuating element mechanically coupled to the payout wheel to rotate it and dispense tape from the roll, first and second blades normally spaced apart on both sides of the tape path of the tool, and means for driving both blades across the tape path between the payout wheel and the applicator roller in a scissor action to cut the tape.

21. The tool of claim 20, additionally comprising means for rotating the payout wheel to move the tape between the blades and the roll away from the blades in the direction of the applicator roller as the blades cut the tape.

22. The tool of claim 21, in which after the blades cut the tape the tape between the blades and the roll is returned to a point where the new end of the tape lies between the blades when they are spaced apart in their normal position.

23. A hand-held tape handling tool comprising:
a pistol-shaped frame having a hand grip;

a rotatable idler roller mounted on the frame near the center of gravity of the tool;
a hub for rotatably supporting a roll of tape, the hub being mounted on the frame adjacent to the idler roller so the hub is translatable in the direction of the center of gravity of the tool;
a rotatable payout wheel mounted on the frame adjacent to the idler roller;
a pressure roller mounted on the frame at its extremity; and
a roll of tape located on the hub, the tape from the roll passing between the hub and the idler roller, being wrapped around a portion of the idler roller, passing between the idler roller and the payout wheel, being wrapped around the payout wheel, and extending to the pressure roller such that the roll of tape, the idler roller, and the payout wheel rotate together as tape is pulled from the tool.

24. The tape handling tool of claim 23, in which a trigger is mounted on the frame in forefinger relationship with the hand grip and means are provided responsive to a pull of the trigger for cutting the tape at a point between the hub and the extremity of the frame.

25. A hand-held tape handling tool comprising:
a pistol-shaped frame having a hand grip;
a rotatable idler roller mounted on the frame near the center of gravity of the tool;
a hub for rotatably supporting a roll of tape, the hub being mounted on the frame adjacent to the idler roller so the hub is translatable in the direction of the center of gravity of the tool;
a rotatable payout element mounted on the frame adjacent to the idler roller;
a pressure roller mounted on the frame at its extremity;
a roll of tape located on the hub, the tape from the roll passing between the hub and the idler roller, being wrapped on a portion of the idler roller, passing between the idler roller and the payout element, being wrapped on a portion of the payout element, and extending to the pressure roller such that the roll of tape, the idler roller, and the payout element rotate together as tape is pulled from the tool; and
an actuating element movable relative to the frame, the actuating element being coupled to the payout element to rotationally drive the payout element as the actuating element is moved, thereby pulling tape from the tool.

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