Sept. 22, 1970 E. E. SHARPE 3,529,757

PRESSURE SENSITIVE ADHESIVE TAPE DISPENSER

Filed Oct. 1, 1968 2 Sheets-Sheet 1

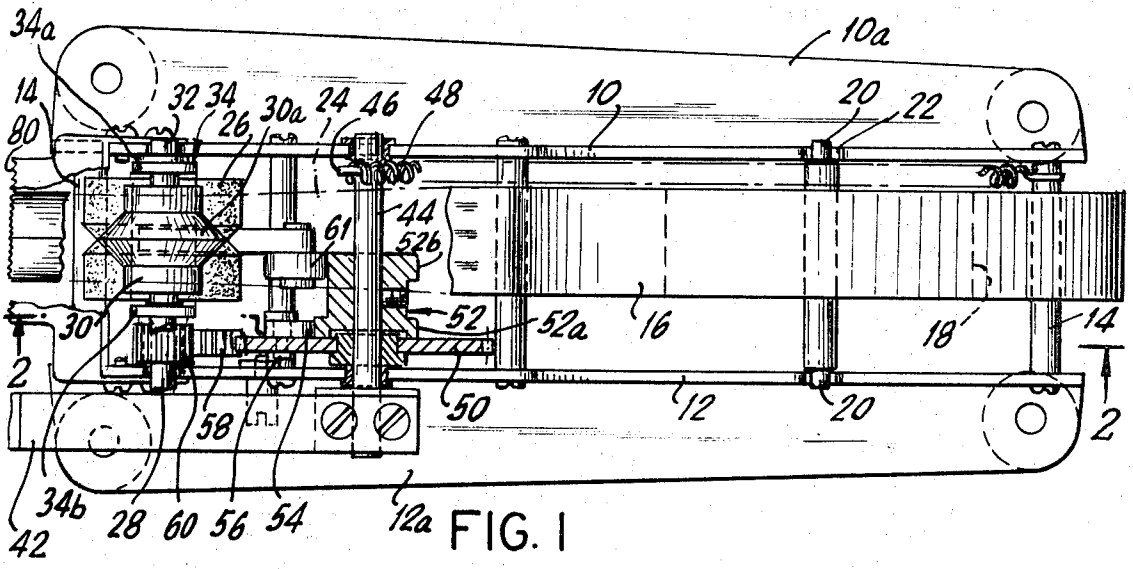


FIG. 1

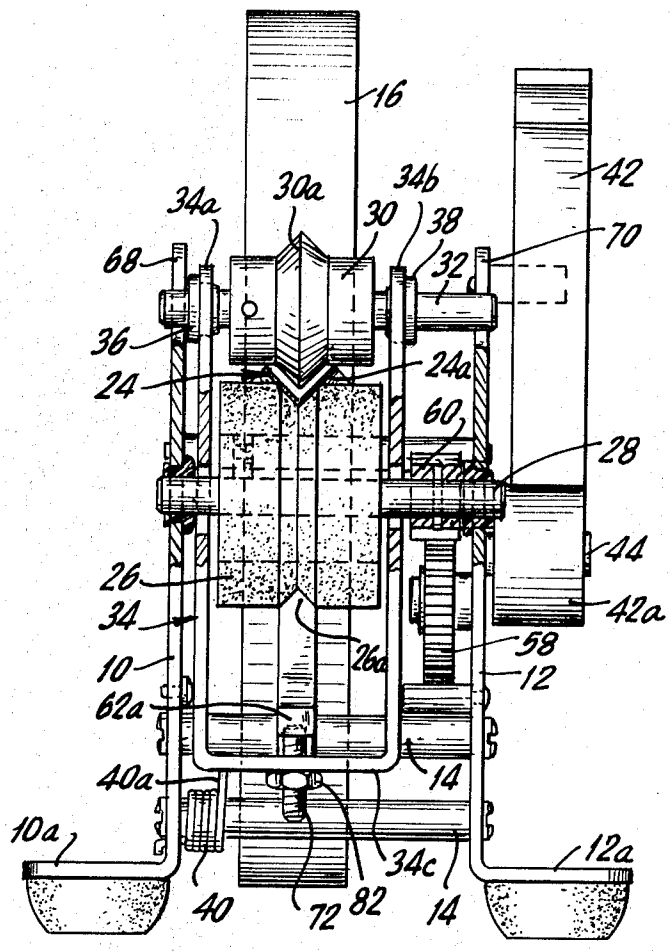


FIG. 3

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PRESSURE SENSITIVE ADHESIVE TAPE DISPENSER

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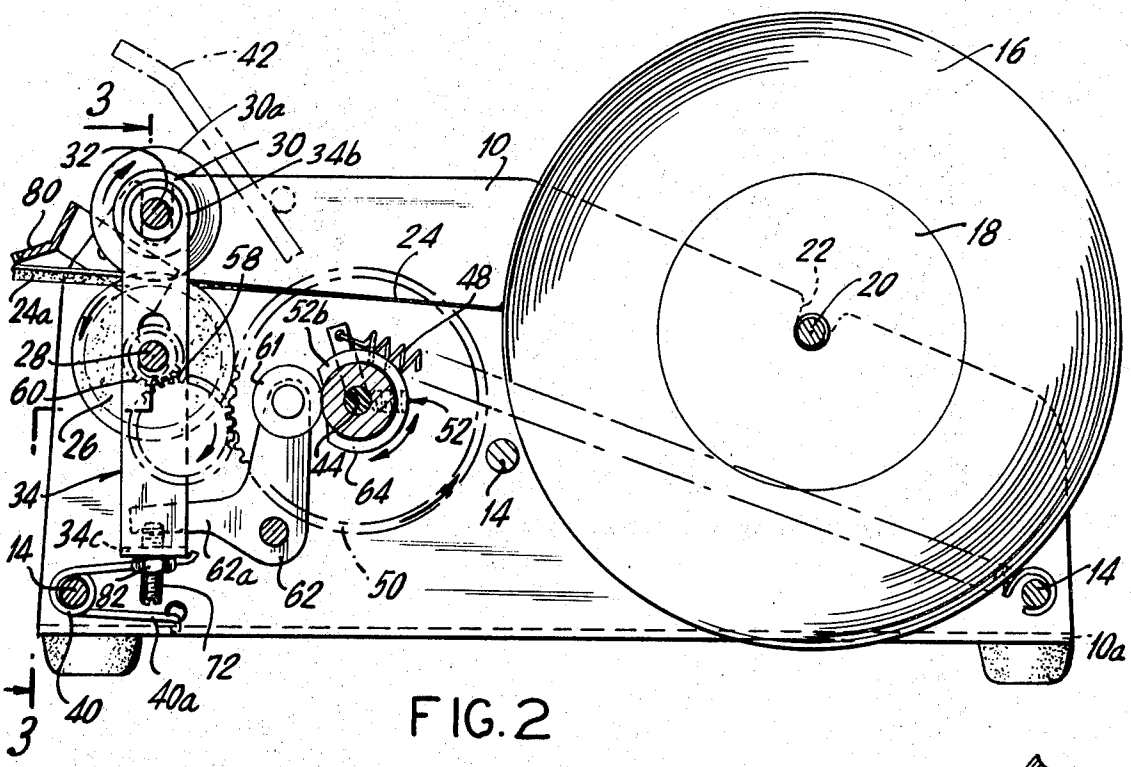


FIG. 2

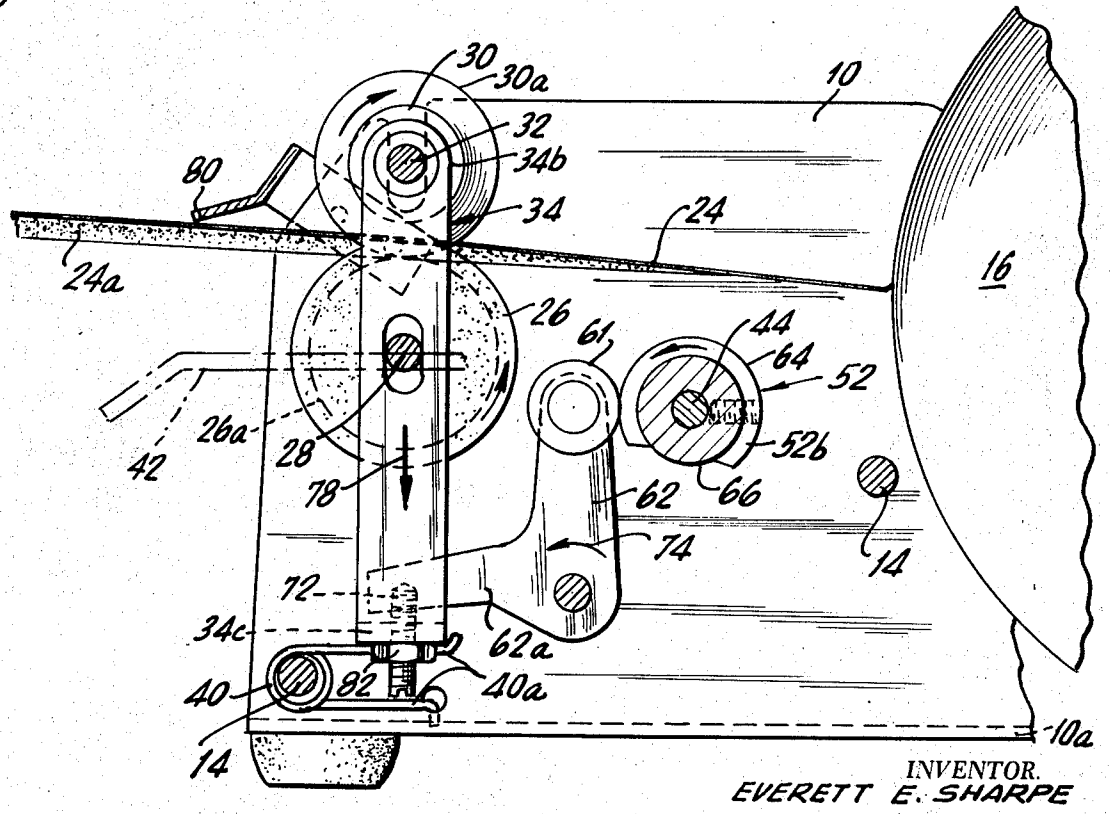


FIG. 4

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PRESSURE SENSITIVE ADHESIVE TAPE DISPENSER

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U.S. Cl. 226—88 10 Claims

ABSTRACT OF THE DISCLOSURE

A device for feeding strip material, particularly a tape having a pressure sensitive adhesive coating on one side, comprises a frame in which is rotatably mounted a lower feed roller having a surface of a material such as a silicon rubber which has good release characteristics in respect to pressure sensitive adhesive. The frame rotatably mounts a reel supply of pressure sensitive tape which is directed with its adhesive side engaging over the lower feed roller. An upper feed roller is mounted on a yoke member for movement toward and away from the lower feed roller and, it includes a V-shaped projection, which may be engaged in a V-shaped groove defined around the periphery of the lower feed roller. A drive mechanism comprises a hand-operated crank which drives the lower feed roller through gearings and which also drives a cam mechanism. The cam mechanism effects the shifting of the yoke member carrying the upper feed roller in a downward direction to cause feeding engagement of the upper and lower feed rollers and the feeding of tape therebetween. The downward movement of the yoke member and the engagement of the upper feed roller with the lower feed roller is not effected until after the lower feed roller has moved by a certain amount in order to break any adherence of the tape to the lower feed roller.

SUMMARY OF THE INVENTION

This invention relates, in general, to strip material dispensing devices and, in particular, to a new and useful device for dispensing a continuous length of tape, having a pressure sensitive adhesive coating on at least one side, using a pair of cooperative feed rollers; and wherein one of the feed rollers which is constructed of a material having good release characteristics for pressure sensitive adhesive is rotated by the drive to initially free it from the adhesive tape and thereafter, the other roller is brought into feeding engagement with the freed roller for the feeding outwardly of the tape material therebetween.

The inventive device is particularly suited for the dispensing of strips of pressure sensitive tapes, and in particular, to the dispensing of those tape materials having a great tendency to curl or to develop static charges of electricity. At the present time, it is known to despense a length of tape by utilizing two cooperative feed rollers between which the tape is fed. A disadvantage in the use of feed rollers with pressure sensitive tape, however, is that the tape material tends either to become firmly affixed to one or both of the feed rollers so that no dispensing is possible, or the dispensing operation is such that the tape material curls and cannot be fed outwardly from the dispenser in a condition in which it may be easily gripped and used by the operator.

In accordance with the present invention, there is provided a tape dispenser particularly for the dispensing of a tape material having a pressure sensitive adhesive on one side which includes a roller mounted in a frame in a position to permit the directing of a length of tape from a roll supply over the roller surface. The roller is advantageously made of material having good release characteristics in respect to pressure sensitive adhesive so that it is advantageous to feed the tape material with the pressure sensitive adhesive side oriented downwardly on the feed roller. The construction includes a yoke member which is slidably movable in the frame and which carries the axle for a cooperating feed roller. The feed roller may be shifted with the yoke member to cause engagement of a V-shaped projection of this feed roller with a V-shaped groove defined in the lower feed roller. The construction includes a rotatable drive shaft, which may be operated by any suitable rotating means such as a hand-operated crank or handle member, for example. The drive includes a gear drive from the shaft to provide for continuous rotation of the lower feed roller when the drive is set in motion. In accordance with a feature of the invention, the drive also includes means for shifting the yoke member carrying the upper feed roller into engagement with the lower feed roller, but only after the lower feed roller has rotated by a predetermined amount and has freed the tape material from the surface of the roller.

The drive mechanism is such that when no tape is being dispensed and the operating crank or other driving mechanism is at rest, the gripping pressure on the tape is released. When the drive is initiated, such as by depressing a crank member, or key arm, the lower feed roller is rotated slightly before any gripping pressure is applied to the tape. This breaks whatever adhesion between this roller and the pressure sensitive tape might exist and which may result, for example, when the device is not operated for long periods of time.

In accordance with a further feature of the invention, the cooperating feed rollers are constructed such that there is a V-shaped projection on one which engages in a V-shaped groove on the surface of the other so that tape fed therebetween will be given a V-shaped cross section as it is fed outwardly therefrom. The apex of the V-shaped cross section is centered between the sides of the tape so that the tape is strengthened and delivered outwardly from the machine in a stiffened condition so that it will be easy to grasp by the operator and to handle for subsequent application.

Accordingly, it is an object of the present invention to provide an improved device for the dispensing of a strip material having at least one side coated with a pressure sensitive adhesive and, which includes a feed roller over which the coated side of the tape is directed and, a cooperating feed roller which is movable into association with the other feed roller to effect the outward feeding movement of the tape, and, wherein the feed rollers are driven by a drive mechanism, which effects first the initial rotation of the feed roller having contact with the pressure sensitive adhesive side of the tape in order to free the tape from adhesion to this roller and the subsequent movement of the cooperating roller into engagement with the feed roller to effect the dispensing of the tape material by feeding between the rollers.

A further object of the invention is to provide a device for feeding a pressure sensitive adhesive tape in a manner such that the feeding may be carried out intermittently to dispense a selected length of tape as desired and, also in a manner to impart rigidity to the tape as it is fed so that is will feed outwardly from the device and in the form of a rigid projection, which may be easily grasped and applied by the operator.

A further object of the invention is to provide a device for feeding strip material, which is simple in design, rugged in construction, and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating ad-

vantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a top plan view of a device for dispensing pressure sensitive adhesive tape constructed in accordance with the invention;

FIG. 2 is a section taken along the line 2—2 of FIG. 1;

FIG. 3 is a front view partially in section of the device, taken along line 3—3 of FIG. 1; and

FIG. 4 is a view similar to FIG. 2 on an enlarged scale and indicating the parts in an operative feedout position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, in particular, the invention embodied therein comprises a device for dispensing a selected amount of pressure sensitive tape in a manner such that it will be easily usable by an operator. The apparatus includes a frame composed of laterally spaced side frame members **10** and **12** which are held in position by cross frame and spacer members **14**. Each side frame member includes a foot portion **10***a* and **12***a*, respectively, to permit the positioning thereof on a table top or desk, for example. A reel supply of pressure sensitive adhesive tape **16** is carried on a drum **18** having journals **20** which are rotatably supported at the lower end of withdrawal slots **22** defined in each of the side frame members **10** and **12**.

In accordance with the invention, the tape **24** is directed with its adhesive-coated side **24***a* oriented downwardly over a lower feed roller **26**. The lower feed roller **26** is secured to a shaft **28** which is rotatably mounted at a fixed location in the side frames **10** and **12**. In the embodiment illustrated, the roller **26** is made of a material having easy release characteristics in respect to pressure sensitive adhesive such as a silicon rubber.

An upper feed roller or cooperating feed roller **30** is affixed to a shaft **32** for rotation therewith. The shaft **32** is rotatably mounted in arm portions **34***a* and **34***b* of a yoke member **34**. The yoke member **34** is centered by guide pins **36** and **38** and its bottom **34***c* engages over a return spring arm **40***a* of a return spring **40** which is coiled around a cross member **14**. The arm portion **40***a* urges the yoke member **34** upwardly to the position indicated in FIG. 3 in which the upper feed roller **30** is out of engagement with the lower feed roller **26**. As is also visible in FIG. 3, the upper feed roller **30** includes a V-shaped projection **30***a* which engages into a V-shaped groove **26***a* of the lower feed roller **26**. The groove **26***a* is centrally located so that when engagement of the upper feed roller **30** with the lower feed roller **26** occurs, the tape which is fed therebetween is imparted with a V-shaped groove which extends longitudinally between the side edges of the tape. This causes a stiffening or rigidizing of the tape and the outward movement thereof during feeding so that the tape extends in the form of an aerial or rigid stick and projects outwardly in a rigid form so that it can be easily grasped by an operator.

In accordance with a further feature of the invention, drive means for dispensing the tape comprises means for effecting an initial rotative movement of the lower feed roller **26** alone in order to free the adhesive surface of the tape from the drive roller in the event that there is a somewhat rigid connection between the two, which may occur, for example, during long periods of no operation. The drive mechanism includes means for shifting the yoke member **34** downwardly to cause the projection **30***a* of the upper feed roller **30** to engage in the groove **26***a* of the lower feed roller **26** and the frictional drive of the tape between the upper and lower feed rollers to dispense a selected amount of tape from the reel supply **16**. In the embodiment illustrated, the drive means includes a crank arm or dispensing key arm **42** having a hub portion **42***a* which is engaged around a drive shaft **44**.

The drive shaft **44**, as best seen in FIG. 1, carries a projection **46** at one end which is engaged by a return spring **48** which has its opposite end engaged over a cross frame member **14** (see FIG. 2). The spring **48** urges the drive shaft **44** in a clockwise direction to return it to an initial position. When the crank **42** is depressed, the shaft **44** is driven in a counterclockwise direction, as viewed in FIG. 2, to an amount corresponding to the amount of the depressing of the crank arm **42**.

Drive shaft **44** carries a gear **50**, which is freely rotatable thereon and also a combined ratchet gear and cam member **52**. A pawl **54** (FIG. 1) is secured to the gear **50** by a pin **56** and it engages a ratchet gear portion **52***a* of the combined ratchet gear and cam member **52**. The gear and cam member **52** is secured to the shaft **44** for rotation therewith at all times, but drives to the gear **50** is through the ratchet portion **52***a* and the pawl **54**.

The gear **50** is in meshing engagement with an idler gear **58** which, in turn, is in meshing engagement with a gear **60** carried by the shaft **28** having the lower feed roller **26**. When the crank **42** is depressed downwardly, the gear **50** will be given a clockwise rotation but when the crank **42** is permitted to return under the action of the spring **48**, the gear **50** will not rotate. The pawl **54** is maintained in engagement with the ratchet wheel portion **52***a* by a spring (not shown). The pawl **54** is advantageously in the form of a gear which is eccentrically mounted on the pin **56**.

Rotation of the shaft **44** causes the continuous rotation of the combined ratchet gear and cam member **52**. The combined ratchet gear and cam **52** includes a cam portion **52***b* which is contacted by a roller follower **61** carried on a follower crank arm **62**. The cam portion **52***b* includes a raised operative cam surface **64** and a reduced or non-operative cam surface or notch **66**. When the follower roller **61** is engaged in the notch portion **66**, the feed wheel **30** is raised by the action of spring arm **40***a* which causes the upward movement of the yoke **34** so that the roller will not be in contact with the lower feed roller **26**. The outer ends of the shaft **32** are guided in slots **68** and **70** on the frame parts **10** and **12**, respectively.

The operation of the device is as follows:

When the crank **42** is depressed for feeding tape, the shaft **44** together with the combined ratchet gear and cam member **52** rotate. The ratchet wheel portion **52***a* also rotates to drive the gear **50** through the pawl **54**. Rotation of the gear **50** causes the rotation of the lower feed wheel **26** through the gearing **58** and **60**. Initially the upper feed roller **30** is out of contact with the tape **24** and the lower roller **26**, as indicated in FIG. 3. However, as the crank **42** is moved downwardly further and the feed roller **26** rotates by an amount sufficiently to break contact of its surface with the adhesive of the tape **24**, the cam follower **61** is moved to a position at which it rides on the surface **64**. The crank follower **62** includes a crank arm portion **62***a* which engages over a set screw **72** which is threaded through an opening in the lower portion **34***c* of the yoke **34**. The rotation which is imparted to the crank arm follower **62** and which is indicated by the arrow **74**, causes a downward movement of the yoke **34** in the direction of the arrow **78** and the engagement of the upper roller **30** with the lower roller **26**. This causes the projection **30***a* to move to engage the tape **24** and to force it into the groove **26***a* and to also cause a frictional driving engagement between the two rollers **30** and **26** and the tape **24**. The tape **24** which is located between the feed rollers **30** and **26** will then be moved outwardly from the two rollers to a location at which it extends substantially rigidly outwardly beneath a serrated cut-off bar **80**. Since the tape **24** projects rigidly

outwardly from the device, it may be easily grasped by the operator and torn across the edge of the serrated cut-off bar **80**. In its rigid V-shaped configuration, it may be moved by the operator into association with the apparatus which is to be taped.

When the crank **42** is released, it is returned by the action of the spring **48** so that the cam portion **52** is also rotated in the return direction. This causes the roller **61** to move off the raised surface **64** and into the notch **66** so that the yoke **34** is again lifted by the spring arm **40***a* to position the upper feed roller **30** out of engagement with the lower feed roller **26**.

The set screw **72** carries an adjustment nut **82** which may be threaded on the set screw **72** for the purpose of changing its position to permit variation of the pressure between the feed rollers **30** and **26**. This variation will affect the amount of the cross section which is imparted to the tape **24** as it is fed between the rollers **30** and **26**.

What is claimed is:

1. A device for feeding strip material particularly for feeding a tape having a pressure sensitive adhesive on one side, comprising a lower rotatable roller of a material having good release characteristics in respect to pressure sensitive adhesive and having a groove defined around it periphery over which the adhesived side of the tape is adapted to be fed, an upper rotatable roller having a projection around its periphery engageable in the groove of said lower rollers, mounting means for rotatably supporting said lower roller, means mounting said second feed roller for rotation and for movement toward and away from said first feed roller for engagement of the projection of said upper roller into the groove of said lower roller and the feeding of the tape therebetween, and drive means connected to said lower feed roller and to said mounting means for rotating said lower feed roller when said upper feed roller is spaced away from said lower feed roller whereby to free said lower feed roller from adherence to the material being fed and to thereafter move said upper feed roller toward said lower feed roller to cause engagement of said feed rollers with the tape therebetween and to effect dispensing of the tape as said lower feed roller continues to rotate.

2. A device, according to claim **1**, wherein said mounting means includes a yoke member rotatably carrying said upper roller, frame means supporting said yoke for movement upwardly and downwardly for shifting said upper roller toward and away from said lower feed roller, said drive means including a member engageable with said yoke for shifting said yoke after said lower feed roller has rotated by a predetermined amount.

3. A device, according to claim **2**, wherein said means for shifting said yoke comprises a crank arm having one arm portion engaged with said yoke and another arm portion having a roller follower, said drive means including a rotatable cam engaged with said follower and adapted to shift said follower after a predetermined movement of said cam.

4. A device, according to claim **3**, including means for adjusting the position of said yoke relative to said follower first arm portion.

5. A device, according to claim **1**, wherein said lower feed roller includes a groove defined therein, said upper feed roller having a projection adapted to engage the tape and to force it into the groove of said lower feed roller.

6. A device for feeding strip material particularly a tape having a pressure sensitive adhesive on at least one side thereof, comprising a mounting frame, a lower feed roller having a peripheral surface of a material having good release characteristics in respect to pressure sensitive adhesive rotatably mounted on said frame, means for mounting a reel supply of a pressure sensitive tape in a position in which the tape is adapted to pass from the reel supply over the surface of said lower feed roller, said lower feed roller having a groove defined around its periphery at a location over which the tape is adapted to be fed, a yoke member movable upwardly and downwardly in said frame, an upper feed roller rotatably mounted on said yoke member in a position overlying said lower feed roller, said upper feed roller having a projecting portion adapted to engage in the groove of said lower feed roller, a rotatable drive shaft, a cam carried on said drive shaft and being rotatable therewith, gear means between said drive shaft and said lower feed roller for rotating said lower feed roller upon rotation of said drive shaft and follower means engaged with said cam and with said yoke and being movable by said cam to shift said yoke to cause said upper roller to engage with said lower feed roller after a predetermined revolution of said lower feed roller.

7. A device, according to claim **6**, wherein said gear means permits backward rotation of said shaft without backward rotation of said lower feed roller, and spring means connected to said shaft to return said shaft in one direction of rotational movement after it has been driven in an opposite direction of rotational movement.

8. A device, according to claim **6**, including a crank arm connected to said shaft, said crank arm projecting outwardly from said frame and being depressable to rotate said crank shaft to drive said lower feed roller.

9. A device, according to claim **6**, wherein said gear means includes a gear freely rotatable on said shaft, pawl means carried by said gear, a second ratchet gear carried on said shaft and being rotatable therewith engaged with said pawl means.

10. A device, according to claim **6**, wherein said follower means comprises a pivotal crank arm follower having one arm with a roller follower in engagement with said cam and another arm portion engaged with said yoke member.

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156—461; 226—5, 96, 127, 154, 187