

- [54] **TAPE APPLICATING APPARATUS**
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- [52] U.S. Cl. **156/391; 156/461; 156/518; 156/521; 156/530; 156/584; 83/282; 83/568; 83/598**
- [51] Int. Cl.² **B65H 35/06**
- [58] Field of Search **156/519, 521, 528, 584, 156/461, 518, 530, 391, 467, 523; 83/553, 568, 598, 282**

[56] **References Cited**

UNITED STATES PATENTS

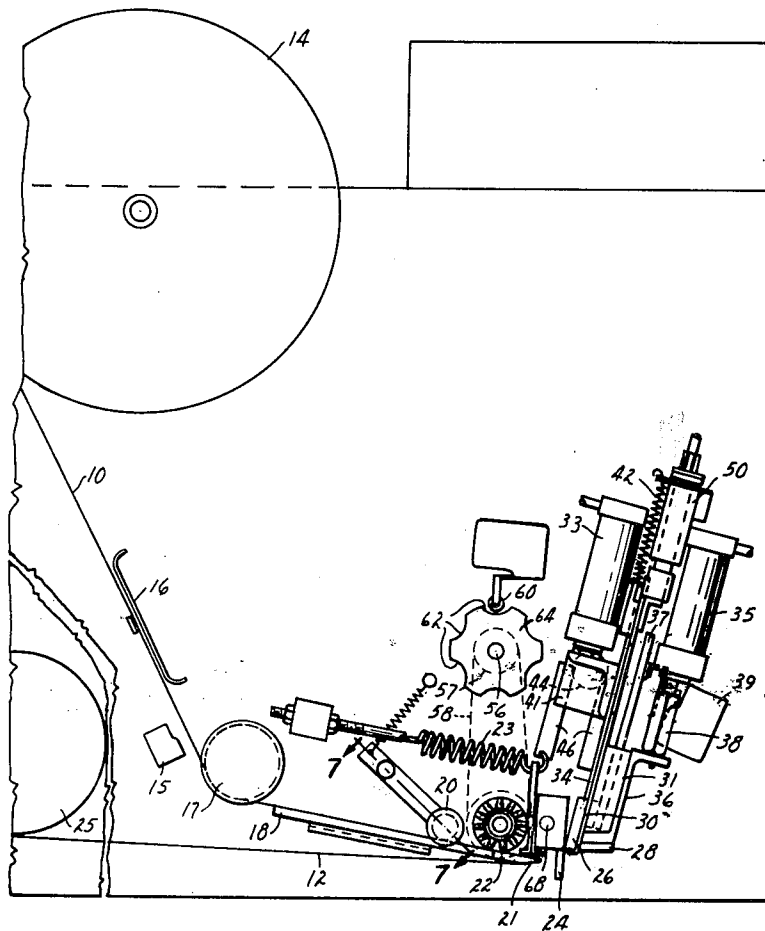
2,823,728	2/1958	Morgan.....	156/467
3,472,724	10/1969	Casey.....	156/521
3,582,433	6/1971	Rothenberger	156/523 X
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[57] **ABSTRACT**

An applying machine for applying short lengths of flexible fibrous material having an adhesive coating to a surface. The applicator uses a pair of fingers to hold the fibrous material onto the surface of an applying pad and a rod to strip the material from the fingers. The fingers are initially spaced from the pad to permit a measured length of flexible material to be moved between the pad and the fingers. The fingers are then retracted to a closed holding position. The fingers support the length of material during the severing of a short length of material by cutting means and while the applying pad transports the severed strip to the surface for application. The measured length of the flexible material to be dispensed and applied, the applying pad, the fingers are moved downward the severed length of fibrous material being applied to a product. A reciprocating push rod places pressure on a portion of the applied flexible material holding the material against the product while the fingers and the pad are retracted. The fingers move to a lowered position to receive another length of fibrous material.

8 Claims, 7 Drawing Figures



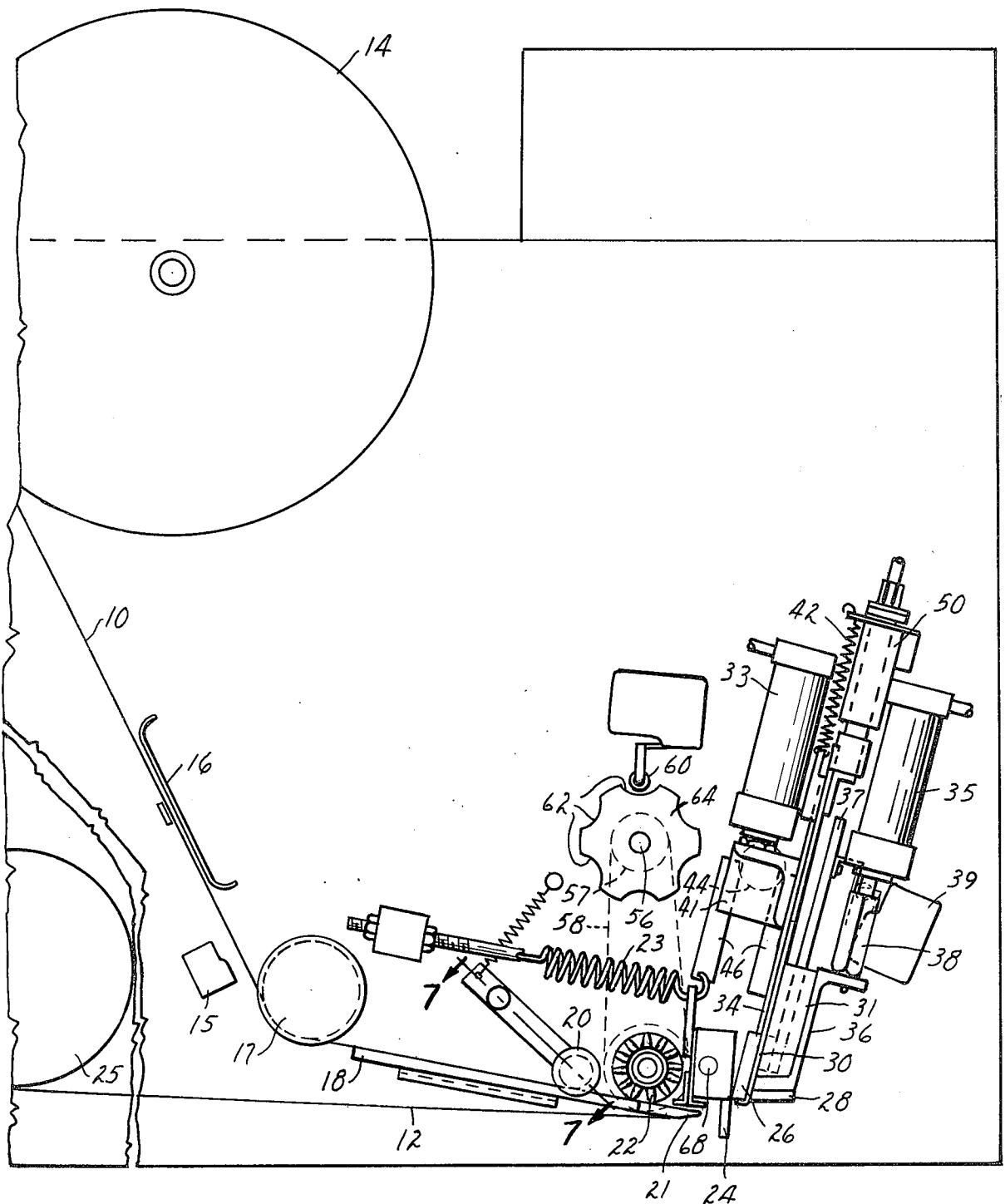


FIG. 1

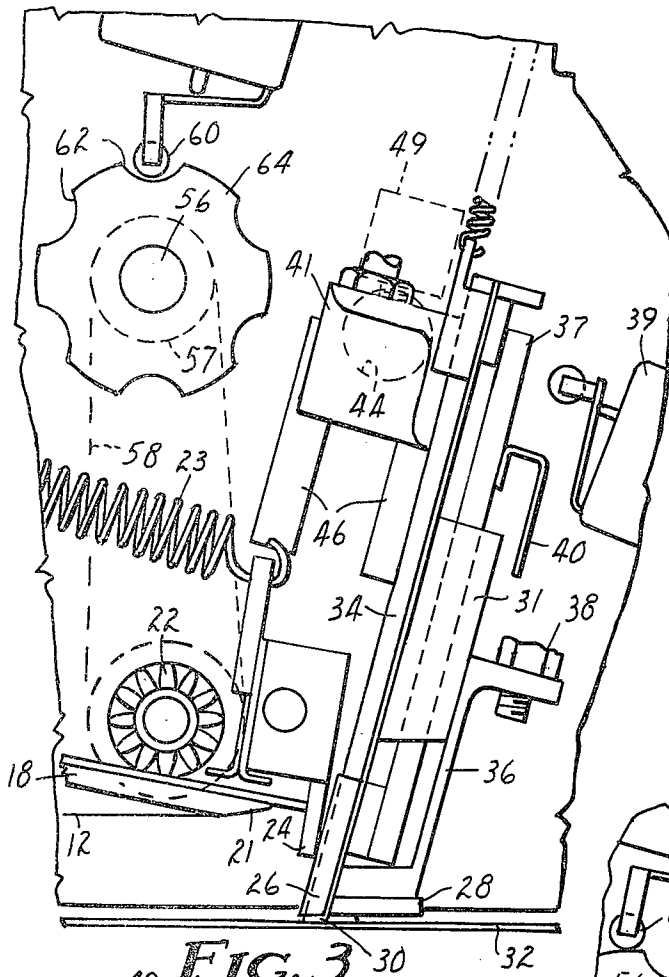


FIG. 3

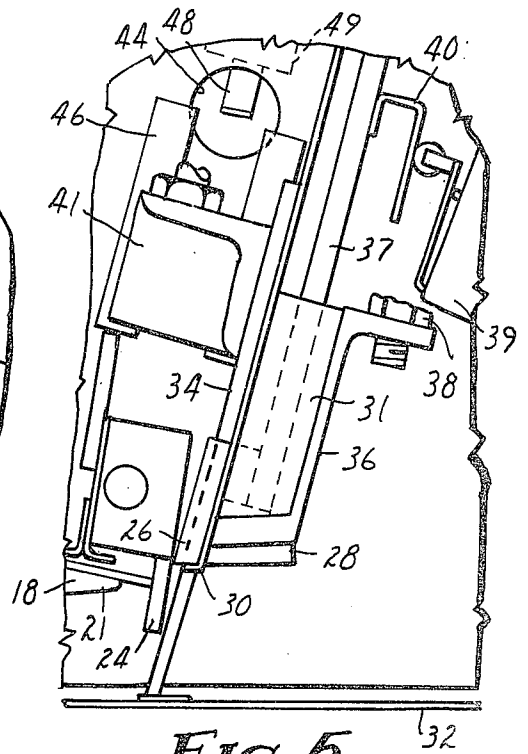


FIG. 5

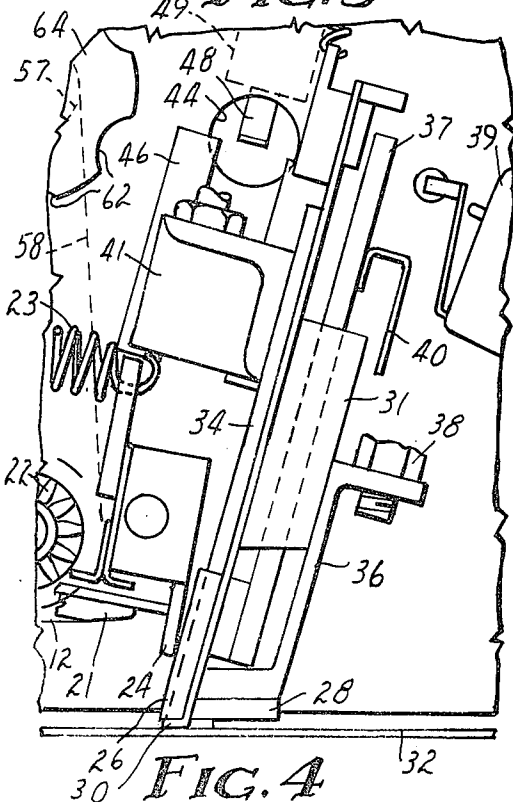


FIG. 4

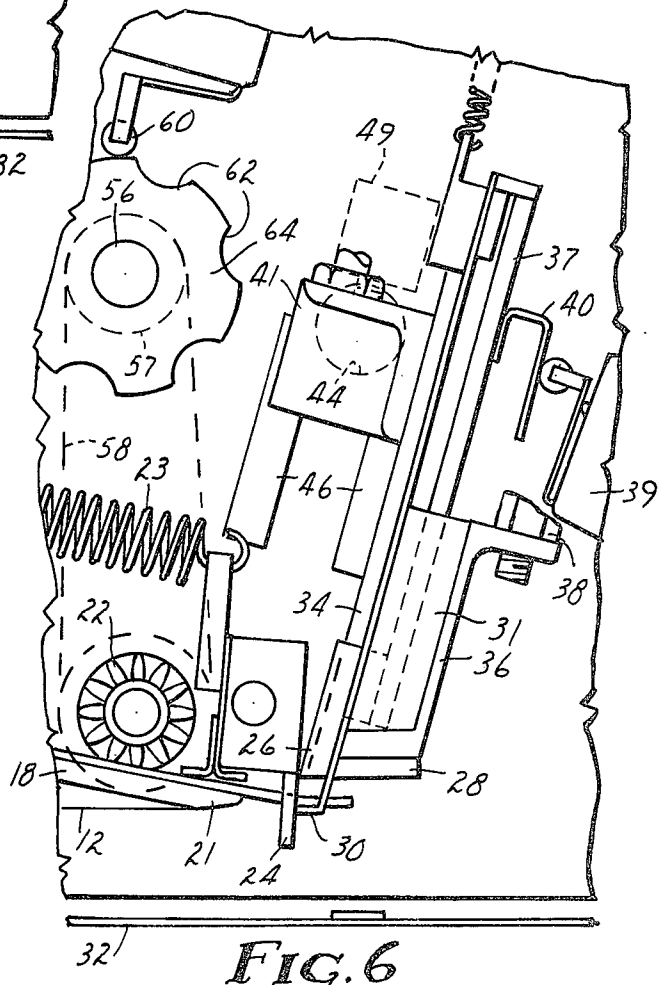


FIG. 6

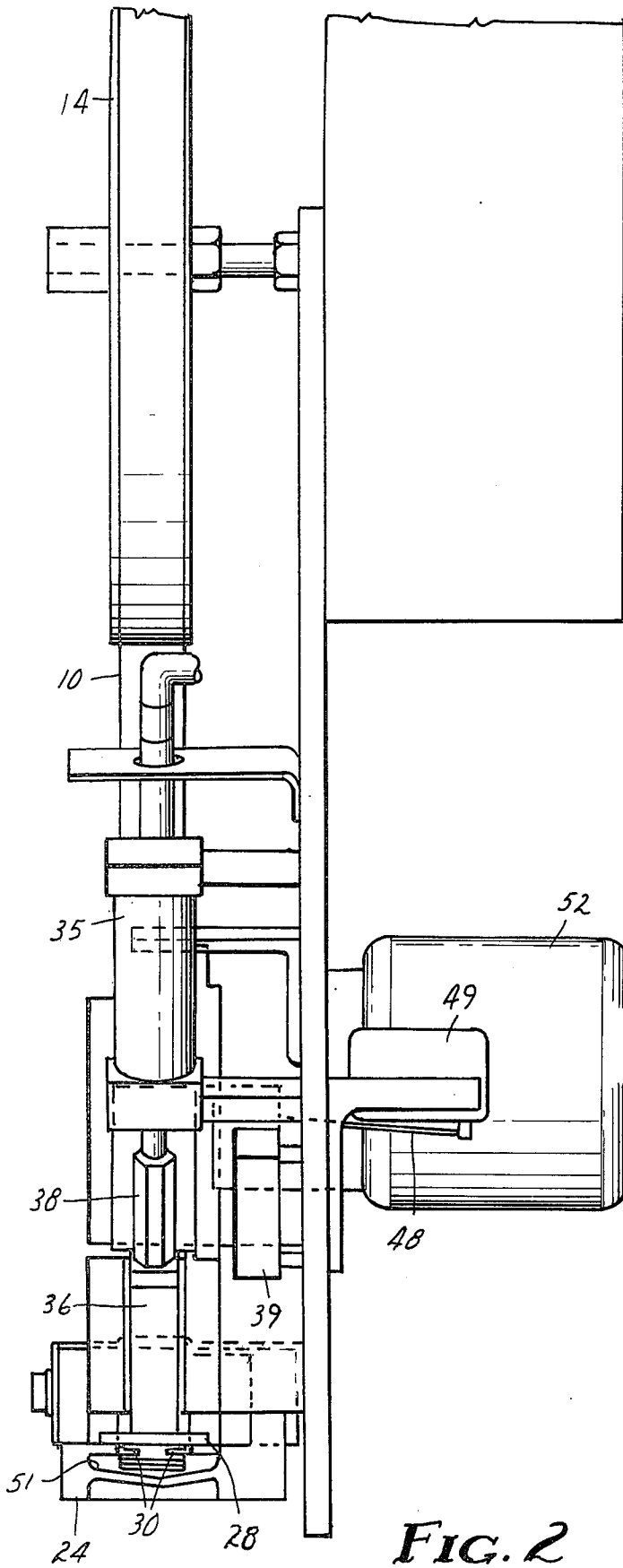


FIG. 2

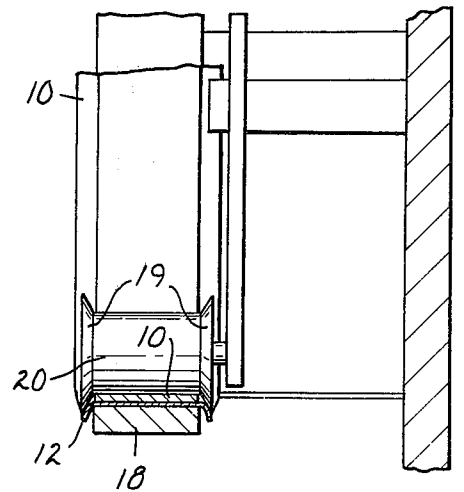


FIG. 7

TAPE APPLICATING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an applicator for an adhesive product and in one respect to an applicator for an adhesive tape product having a porous, fibrous or lofty surface opposite the adhesive.

2. Description of the Prior Art

The application of adhesive material in short lengths to a surface is not new in the art as such applicators are known; one example being shown in U.S. Pat. No. 3,472,724 issued Oct. 4, 1969 to J. H. Casey. These devices, however, have utilized a slight vacuum in the pad to hold the tape to the pad's surface as the tape and pad move past the cutting means toward the surface to which the tape is applied. After application the vacuum is discontinued and the pressure-sensitive adhesive secures the tape to the surface. Such devices will not hold a fibrous tape material where the vacuum is applied to a fibrous backing which is lofty and air permeable.

The material which is to be applied by the apparatus of the present invention is a tape material having a surface which cannot be held by application of a sub-atmospheric pressure to the surface, i.e., a porous, fibrous or lofty surface secured to a backing or base material and a surface coated with a pressure-sensitive adhesive opposite the lofty surface. A release liner is generally placed over the pressure-sensitive adhesive permitting the material to be convolutely wound. The specific construction of the tape to which the present invention is directed is claimed and described in U.S. Pat. No. 3,009,235 issued Nov. 21, 1961 to G. Mestral, the disclosure of which relates to a fibrous tape material and is incorporated herein by reference.

SUMMARY OF THE INVENTION

The machine of the present invention comprises a frame supporting dispensing means for a flexible fibrous material and an applying head. The dispensing means drives the fibrous material into the applying head across a pivoting shear blade to the undersurface of an applying pad member and above a pair of fingers which are in their lowered position. After a desired length of flexible material has moved across the cutting edge the fingers move towards the undersurface of the pad gripping the fibrous material between the pad and fingers. The pad, fingers and material are moved toward the surface to which the material is to be applied. A shear blade carried with the pad pushes the flexible material against the pivoting blade severing the flexible material and the pad places the adhesive side of the severed material into engagement with the product. A push rod moves down placing a pressure point on the material between the fingers holding the material firmly on the product. The pad, shear blade and fingers then return to their initial position while the push rod remains lowered, the push rod retracts, the fingers move to their lowered position spaced from the pad, and another length of tape is fed through the pivoting shear and between the fingers and the pad.

DESCRIPTION OF THE DRAWING

An illustrative embodiment of the present invention is described with reference to the accompanying drawing wherein:

FIG. 1 is a side elevational view of an applying machine constructed in accordance with the present invention;

FIG. 2 is an end view of the applying machine;

FIG. 3 is an enlarged fragmentary view of the cutting and applying head with the same in an applying position;

FIG. 4 is an enlarged fragmentary view similar to FIG. 3 but showing the parts with the push rod in the lowered position;

FIG. 5 is an enlarged fragmentary view showing the applying pad and fingers in a retracted position with the pusher rod in the lowered position;

FIG. 6 is a fragmentary detail view of the applying pad in the material feed position; and

FIG. 7 is a sectional view of FIG. 1 taken along the line 7-7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In general, a strip of flexible fibrous material **10** comprising a backing with a porous material secured on one side and having a pressure-sensitive adhesive disposed on the side opposite the porous material and a release liner **12** surfacing said adhesive, said liner being wider than the width of said fibrous material, is fed from a supply roll **14** and passes through a metal ski-shaped guide **16** and around a guide spool-shaped roller **17** under mild tension. The material **10** then passes along a platen **18** and under a second spool shaped roller guide **20**. The width of the platen and the depressed area at the center of the roller **20** are equal to the width of the fibrous material and less than the liner **12** so that the edges of the liner are folded or bent down along the edges of the platen to be guided thereby. A feed roller **22** having a plurality of teeth engaging the lofty fibrous material **10** rotates pulling the material **10** from the supply roll **14**. The material being fed is directed from the platen over the cutting edge of a pivoting shear blade **24**. The pivoting shear blade **24** cooperates with a second shear blade **26** to sever the material **10** as a pad **28** and fingers **30** of the apparatus push a measured length of the fibrous material down towards a receptor surface or product **32** to which the measured length of material is to be applied. After the pad **28** has pressed the severed material against the product **32** a push rod **34** descends and retains the severed fibrous material in contact with the product while the fingers **30**, the sheat **26** and the pad **28** are retracted. The push rod **34** is then retracted leaving the fibrous material in contact with the product. After the severed fibrous material has been applied to the product it is desirable that the applied material be pressed, that is additional pressure applied to the entire surface of the material, to insure all the pressure sensitive adhesive has made contact with the underlying product **32**.

In greater detail, material **10** from the supply roll **14** passes under the metal ski shaped guide **16** under a light tension which keeps the material in a straight line past a photoelectric cell **15**. The photoelectric cell **15** will sense when a splice or other imperfection is present in the material **10** or the end of the material has come off the supply roll **14**. This allows a new roll of material to be spliced or fed into the machine before the machine empties and prevents the machine from being jammed by the small pieces of residual material which would otherwise be formed and fall into the machinery. The fibrous material **10** passes under the guide roller

17 which has a reduced section suitable for receiving the fibrous material, the fibrous material is then drawn onto the platen 18. The liner 12 is sufficiently wider than the fibrous material 10 that the edges of the liner projecting past the edges of the material will overlap the edges of the platen and flanges or rims 19 of the second guide roller 20 will physically bend the edges of the liner over the platen forming a U-shaped configuration. This insures the fibrous material 10 will move in a straight line under and past the feed roller 22. At the end 21 of the platen 18 the liner 12 is peeled from the material 10, and the material 10 will be fed in a straight line between the cutting edges of the shear blades 24 and 26, and between the applying pad 28 and the spaced fingers 30. The removed release liner 12 is wound on take-up roll 25.

At the start of an application cycle the fingers 30 are raised, by a spring 42, holding the end of material 10 against the underside of applying pad 28. The applying pad 28 is a plate having a smooth lower surface and is secured to a bracket 36 mounted to a rod 37 which moves in a channel in block 31 secured to a supporting frame. The bracket 36 is also secured to the blade 26 so the blade moves in conjunction with the pad 28 and the fingers 30 are also in contact with the blade 26. Upon activation of a double acting cylinder 35 connected to the bracket 36 by an extension 38, the bracket 36, pad 28, fingers 30 and the shear blade 26 move downward severing the flexible material 10 between reciprocating blade 26 and shear blade 24 which is biased into engagement therewith by a tension spring 23 pivoting the blade 24 about an axis 68. As reciprocating blade 26 moves downward the shear blade 24 rotates so that the shearing edges are in contact providing a clean shearing action. After the pad, fingers and the blade are in the applying position, a switch is opened to actuate a cylinder 33 causing the push rod 34 to descend through a channel in the blade 26 to hold the severed portion of fibrous material 10 at its center between the fingers 30 insuring a portion of the fibrous material remains in contact with the product 32 during withdrawal or return of the fingers, blade 26 and pad 28. After the push rod 34 has descended a time delay mechanism actuated by a time delay relay in the pad circuitry activates cylinder 35 retracting bracket 36, pad 28 and blade 26 to a raised position. The fingers 30 are pulled to a raised position by the slide 37. As the bracket 36 is raised cam 40 on rod 37 activates switch 39 which in turn actuates the push rod cylinder 33 retracting the push rod 34.

Cylinder 33 then retracts the push rod 34 leaving the fibrous material firmly attached to the product 32. As the push rod 34 is retracted by the cylinder 33 the bracket 41 supporting the push rod 34 has a circular cam follower (not shown) which is guided in a race formed by slides 46 and activates a switch lever 48 projecting through aperture 44 which closes the switch 49 to in turn activate the cylinder 50 and start a motor 52. Cylinder 50 pushes the fingers 30 down away from the underside of pad 28 to a spaced position about one-half inch below the pad or to a feed position where material 10 passing through the V-shaped opening 51 in the shear blade 24 will be above the fingers. The motor 52 then turns a drive shaft 56 and sprocket 57 driving a belt 58 and a sprocket attached to the feed roller 22 thereby advancing the material through the shear blade 24 until a cam follower on a switch 60 drops into the next indentation 62 of cam 64 which

kicks out a relay and turns off the motor. The fluid pressure to cylinder 50 is also interrupted and the fingers 30 return upward because of the bias of spring 42 and the apparatus is ready to cut and apply another strip of material. Attachment of an oiling wick which contacts the lower edge of shear blade 26 when said blade is in the rest position will lubricate the blades with every stroke and aid the proper functioning of the apparatus. The length of material fed onto the application pad is determined by the size of the feed roller 22, the distance between cam lobes 62, size of cams, sprockets, etc. The length to be applied can be varied greatly; however, this apparatus is particularly suitable for short strips, e.g. $\frac{1}{4}$ - $1\frac{1}{2}$ inch pieces, more specifically three-eighths to one-half inch, which are useful as envelope closures, etc.

The preferred shearing mechanism of the applying apparatus of this invention comprises two members, a first reciprocating shear blade and a second pivoted shear blade. The reciprocating shear blade has a straight cutting surface which moves at an angle to the vertical and is actuated downward by a reciprocating air driven cylinder 35 as described hereinbefore. The second pivoting shear blade is spring biased and has a V-shaped cutting edge on the lower side of an aperture 51 which allows material to pass through easily. Upon downward motion of the reciprocating shear blade the pivoting shear blade will pivot about shaft 68 to bring the side of the blade 24 into contact and parallel alignment with the blade 26.

One example of a similar shearing apparatus for severing pressure sensitive adhesive tapes is disclosed in U.S. Pat. No. 3,472,724 issued Oct. 4, 1969 to Casey. The disclosure with respect to the action of the shearing blades and the shape of the V-shaped aperture is incorporated herein by reference.

Having described the invention with respect to a particular embodiment, it is to be understood that modification may be made without departing from the scope of the invention.

What is claimed is:

1. An apparatus for severing and applying short lengths of a flexible fibrous material cut from a length of said material and having an adhesive disposed on one side thereof to a product including:

- a housing;
- dispensing means mounted on said housing and adapted to advance predetermined lengths of the flexible fibrous material;
- cutting means for severing the dispensed lengths of flexible material; and
- an applying means mounted on said housing so as to receive the severed lengths of measured material dispensed by said dispensing means, said applying means comprising:
 - a reciprocating pad located on the side of said cutting means opposite said dispensing means having a surface suitable for pressing a severed length of material against a product;
 - a bifurcated plate supported on said pad and defining fingers positioned one on each side of said pad and extending toward each other, said plate being movably mounted in relation to said pad to hold a severed portion of said fibrous material against said surface of said pad and adapted to move with said pad so that when said pad is moved said fingers hold said fibrous material firmly;

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means for retracting said fingers and said reciprocating pad from said product; a push rod supported for reciprocating movement parallel to and independent of said pad and positioned for movement between said fingers to a holding position when said pad has applied said severed material to said product to hold said severed material against said product when said pad and fingers are retracted insuring the severed material is not pulled from the product when the fingers are retracted.

2. The apparatus of claim 1 wherein said dispensing means comprises a toothed feed roller engageable with the fibrous surface of said material.

3. The apparatus of claim 1 wherein said dispensing means comprises a platen located so said fibrous material passes along the upper surface thereof; a spool roller guide having a depressed area at the center of the roller of a width equal to the width of said platen and said fibrous material located above said platen; and a toothed roller engaging the fibrous portion of said material and located so as to draw the material along said platen and under said roller guide.

4. The apparatus of claim 1 wherein said cutting means includes a cutting edge joined to said reciprocating pad.

5. The apparatus of claim 1 wherein said cutting means comprises a pivoted knife having an aperture therein through which the fibrous material is fed; and a reciprocating knife joined to the reciprocating pad whereby as said pad is lowered to the applicating position said material is severed between the reciprocating knife and the pivoted knife.

6. The apparatus of claim 1 wherein said dispensing means comprises a platen located to support and guide said fibrous material along one surface thereof toward said cutting means, a guide roller engageable with said fibrous material rotatably mounted on an axis transverse to said platen and having radially extending end flanges positioned to extend along the edges of said platen to guide the material along said platen.

7. The apparatus of claim 6 wherein said dispensing means includes a driven roller having a toothed outer peripheral surface positioned adjacent said one surface to engage said fibrous material and frictionally advance said material along said one surface toward said cutting means.

8. An apparatus for severing and applying short lengths of tape comprising a backing having a pressure-

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sensitive adhesive coating on one surface thereof, a liner wider than said backing, said liner surfacing said adhesive with the edges of said liner extending beyond said backing and said backing having a lofty fibrous surface opposite said adhesive coated surface, to a product including:

- a housing;
- a platen for supporting said tape and liner, said platen having a width equal to the width of said backing;
- a guide roller engageable with said fibrous surface to hold said tape and liner on said platen, said roller having radially extending flanges to engage and bend the outward extending edges of said liner along the edges of said platen to guide said tape and liner along said platen;

means for dispensing tape from an end of said platen in predetermined measured lengths comprising a driven roller which engages the lofty surface of said tape to move said tape and liner along said platen, and means at said end of said platen for peeling said liner from said tape;

cutting means for severing the dispensed lengths of tape; and

an applicating means mounted on said housing to receive the severed lengths of tape comprising:

- a reciprocating pad located on the side of the cutting means opposite said dispensing means having a surface suitable for pressing a severed length of tape against the product;
- a bifurcated plate slidably supported on said pad and defining a pair of fingers positioned one on each side of said pad and movable in relation to said pad to hold a severed portion of said tape firmly against an applicating surface of said pad and adapted to move with said pad, said fingers extending toward each other over said surface;

means for retracting said fingers and said reciprocating pad from said product;

a push rod supported for reciprocating movement parallel to and independent of said pad and in position for movement between said fingers to a holding position whereby when said pad has applied said severed length of tape to said product, said rod can hold said severed material against said product while said pad and fingers are retracted insuring the severed material remains in contact with said substrate when the fingers are retracted.

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