

Feb. 7, 1961

T. H. KRUEGER ET AL

2,970,416

STRIP SERVING AND APPLYING DEVICE

Filed June 7, 1955

5 Sheets-Sheet 1

INVENTOR.
THEODORE H. KRUEGER
EVERETT E. SHARPE.
BY
MOSES NOLTE-CREWS
& BERRY.

Feb. 7, 1961

T. H. KRUEGER ET AL

2,970,416

STRIP SERVING AND APPLYING DEVICE

Filed June 7, 1955

5 Sheets-Sheet 2

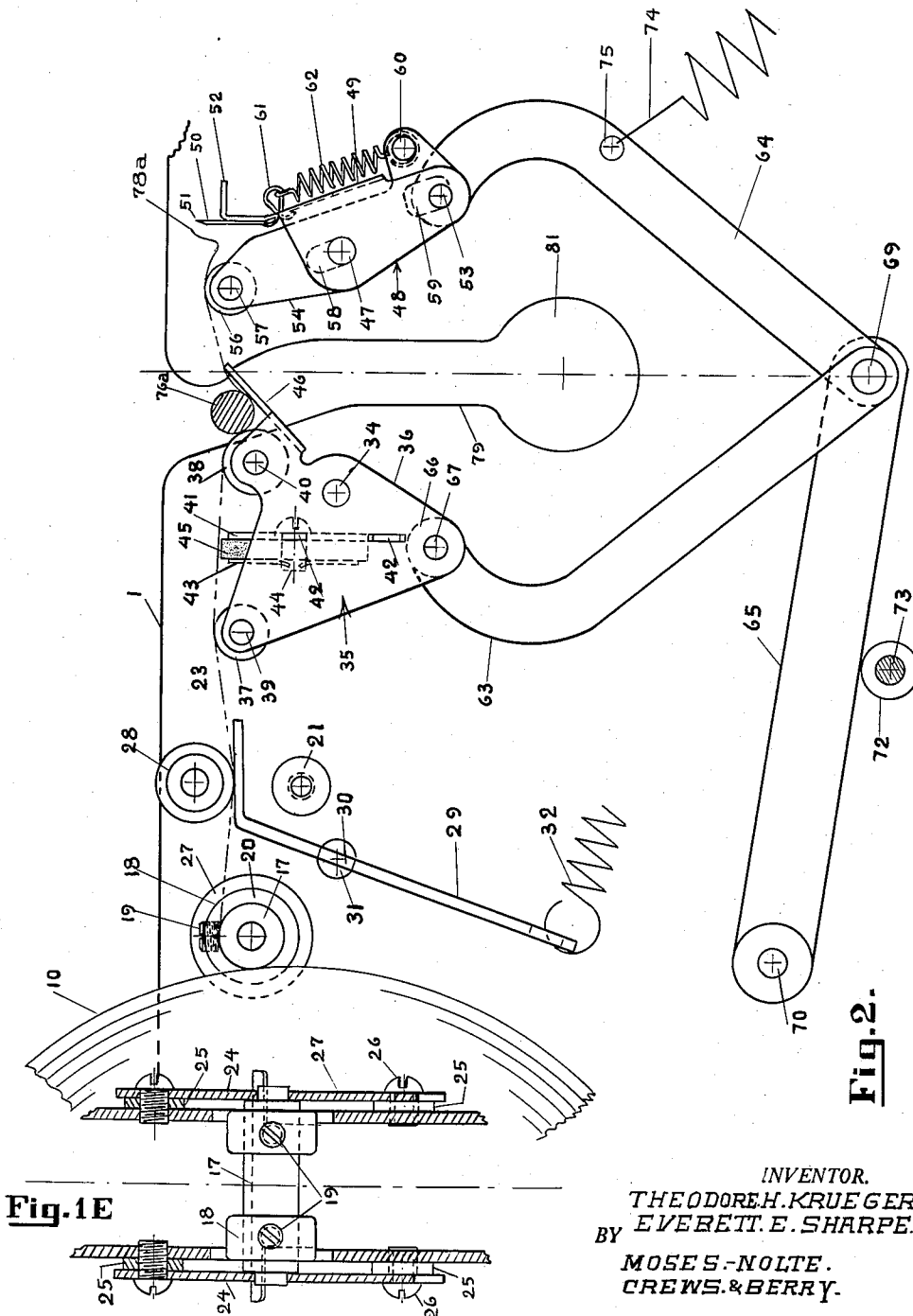


Fig. 1E

Fig. 2.

INVENTOR.
THEODORE H. KRUEGER.
BY EVERETT E. SHARPE.
MOSES NOLTE.
CREWS & BERRY.

Feb. 7, 1961

T. H. KRUEGER ET AL

2,970,416

STRIP SERVING AND APPLYING DEVICE

Filed June 7, 1955

5 Sheets-Sheet 3

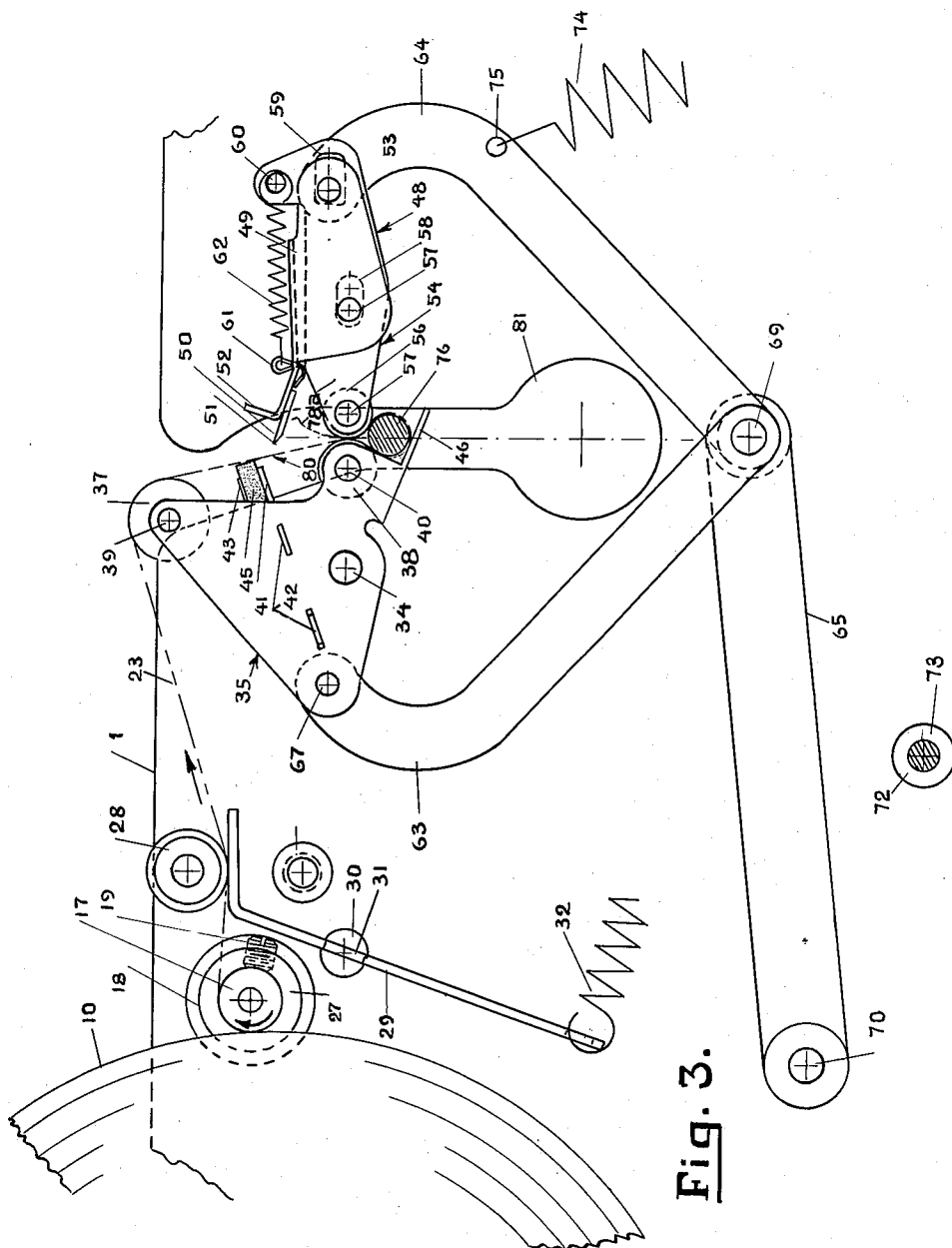


Fig. 3.

INVENTOR.
THEODORE H. KRUEGER
EVERETT E. SHARPE.
BY
MOSES-NOLTE-CREWS
& BERRY.

Feb. 7, 1961

T. H. KRUEGER ET AL

2,970,416

STRIP SERVING AND APPLYING DEVICE

Filed June 7, 1955

5 Sheets-Sheet 4

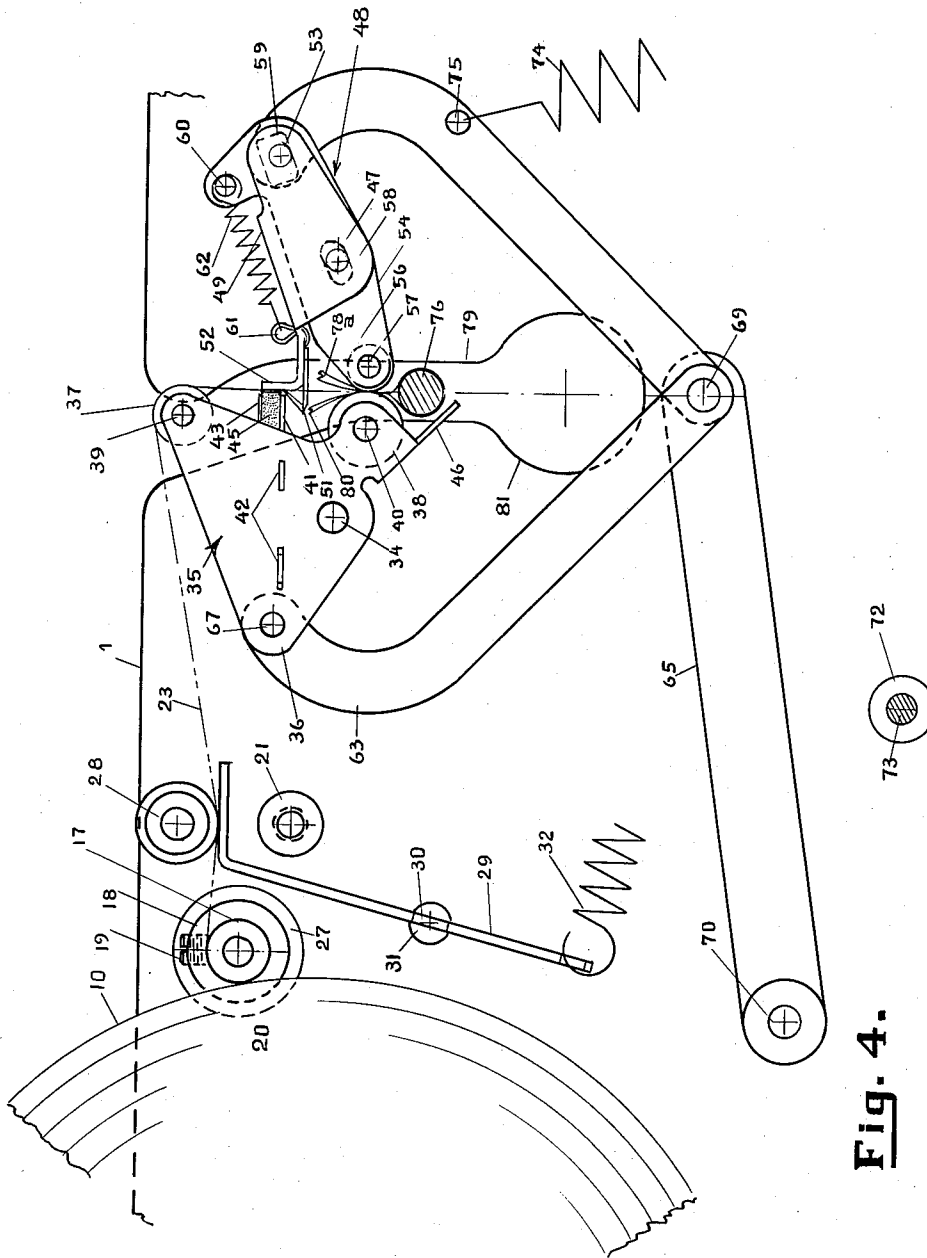


Fig. 4.

INVENTOR.
THEODORE H. KRUEGER
BY EVERETT E. SHARPE
MOSES - NOLTE-
CRENS & BERRY.

Feb. 7, 1961

T. H. KRUEGER ET AL

2,970,416

STRIP SERVING AND APPLYING DEVICE

Filed June 7, 1955

5 Sheets-Sheet 5

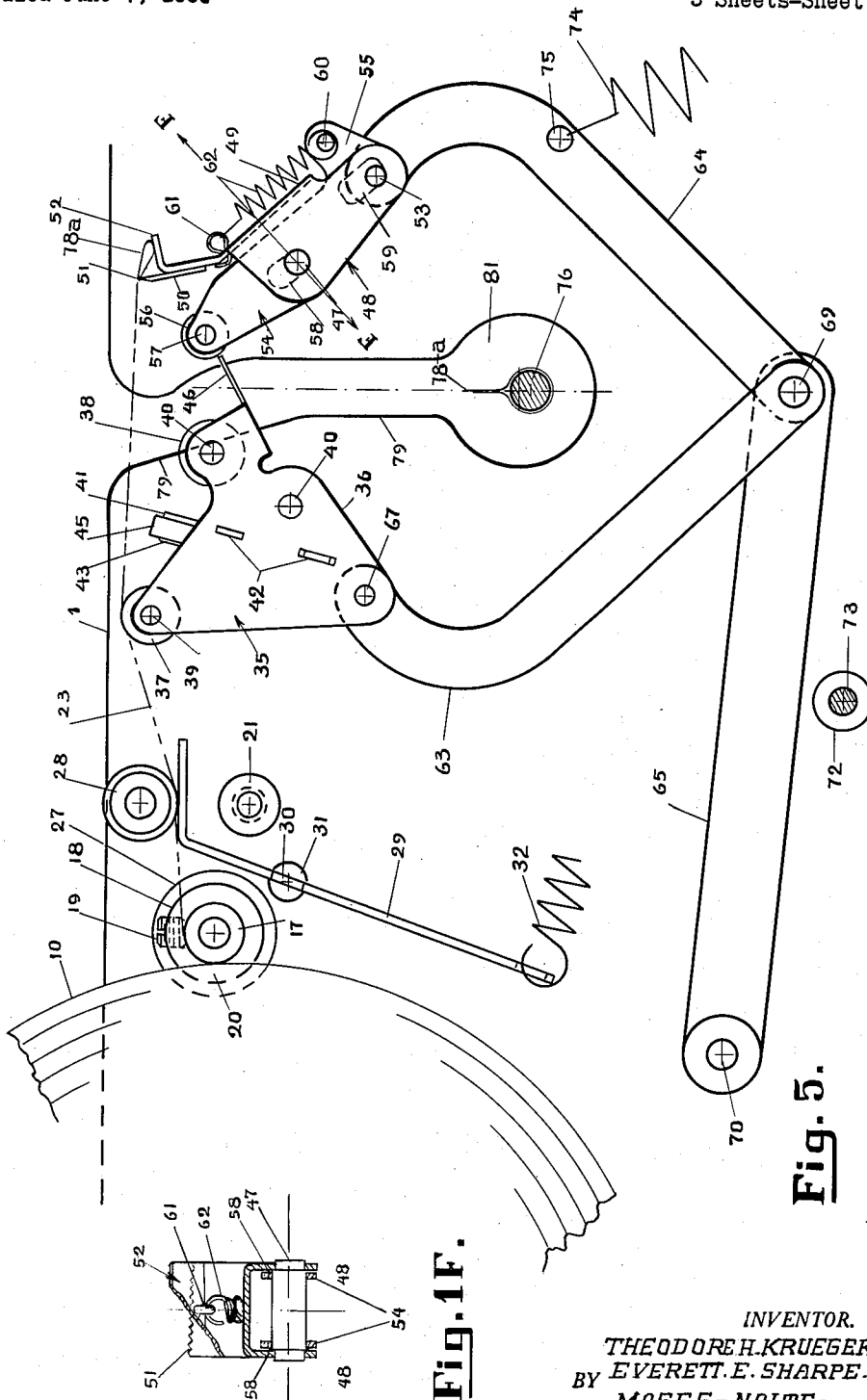


Fig. 1F.

Fig. 5.

INVENTOR.
THEODORE H. KRUEGER.
BY EVERETT E. SHARPE.
MOSES-NOLTE-
CREWS & BERRY.

1

2,970,416

STRIP SERVING AND APPLYING DEVICE

Theodore H. Krueger, Stratford, and Everett E. Sharpe, Shelton, Conn., assignors to Better Packages, Incorporated, a corporation of New York

Filed June 7, 1955, Ser. No. 513,688

8 Claims. (Cl. 53—198)

This invention relates to a device or machine for applying a band of adhesive tape around an object. It is particularly applicable to the applying of a band of pressure sensitive tape which is wrapped around the object and has its ends brought together so that they adhere to each other and form a tight seal. The invention finds particular utility as a means for sealing a twisted neck of a bag, such as a plastic bag for holding vegetables, etc. so as to hold the bag tightly closed to retain and preserve its contents. The invention, however, is also useful for the application of bands of tape around other objects than bags, such as tubes, rods, or wires for the purpose of identification, or to hold a small bundle or group of slender articles, rods for example, together.

The machine of the present invention is particularly useful because but a single action on the part of the operator is all that is necessary to cause the tape to be wrapped tightly around the neck of the bag or other object, its ends sealed together, the tape to be cut off and sufficient tape to be drawn from the supply to provide for the next operation of the machine. All of this is accomplished by a simple downward motion of the bag neck and its withdrawal from the machine by a lateral sweep at the end of the downward motion which removes the sealed bag neck from the machine. This is in effect a one motion operation as distinguished from machines of the prior art in which at least four motions are required of the operator. In the old machines these are first to push the neck of the bag down in a slot and to rotate the bag or other object so as to wrap the tape around the bag neck. Then the bag neck with the tape around it but still connected to the tape supply roll is lifted out of the slot and pulled forward so as to pull the tape off the supply roll, and during this motion the operator has to visually measure or estimate the length of tape withdrawn so as to bring the tape over the tear-off blade at the proper point to leave the right amount of tape for the next operation. Finally the neck of the bag is moved downwardly so as to tear the tape off across the tearoff blade and separate the closed bag from the strip of tape which has been pulled off the tape supply roll in position for the next closure. All of these extra motions are unnecessary with the present invention.

The machine of the present invention feeds only the amount of tape necessary for applying the band to the article sealed, so that only the minimum amount of tape required is used and there is no waste.

In the accompanying drawings which illustrate one preferred form of the invention as applied to bag sealing machines:

Figure 1 is a side elevation of the machine with the front portion of the left side frame cut away to show the internal construction;

Figure 1A is a top plan view of the machine;

Figure 1B is a transverse section through the lower parts of the side frames and inverted channel shaped base;

Figure 1C is a view of the sealed bag.

2

Figure 1D is a section on line 1D—1D of Fig. 1;

Figure 1E is a horizontal section on line E—E of Fig. 1;

Figure 1F is a section on line F—F of Fig. 5;

Figures 2, 3, 4 and 5 are diagrammatic views in side elevation showing successive positions of the machine parts in applying a band to the bag or other article.

Referring to the drawings in detail the machine comprises a left frame 1 and a right frame 2 fastened to a base 3 by screws 4 which go through holes in the side frames 1 and 2 and the ears 5 which are formed from the base 3. Attached to the base 3 are four rubber feet 6 fastened by rivets 7. Also in the base 3 are holes 8 by which the machine can be permanently fastened to a table or bench with screws if so desired. Also supporting the side frames 1 and 2 and maintaining the proper space between them are three tie rods 21 held in place by the screws 22.

In the space between the upper rear portion of the side frames 1 and 2 is the tape supply roll 10. This is held in place by the spool assembly 11. The outside edges 13 of the vanes 12 fit tightly into the hole 14 of the tape supply roll 10. The spool assembly 11 is carried by the shaft 15 the ends of which rest on the bottom edges 16 of the slots 9 in the side frames. The bottom edges 16 of the slots 9 are inclined downward to the front urging the tape supply roll 10 against the roller 17 between two collars 18 which are adjustably held on the roller 17 by the set screws 19. Since the tape supply roll is urged against the roller 17 by gravity and the pulling of tape through the machine, the outer peripheries of the collars 18 will overlap the sides of the tape supply roll 10 at point 20 and keep the tape supply roll fixed in the center of the space between the side frames 1 and 2. The roller 17 is journaled in the brackets 24 which are spaced from the side frames 1 and 2 by the spacers 25. The brackets 24 are fastened to side frames 1 and 2 by screws 26. The roller 17 passes through clearance holes 27 in the side frames which are large enough to receive the collars 18 and set screws 19. This permits the collars to be adjusted outwardly to the ends of roller 17 so as to accommodate the wider strips of tape.

The tape supply roll 10 is placed in the machine so that the tape 23 has the adhesive or tacky side upward. The tape 23 goes over the top of the roller 17 and between the collars 18. The roller 28 journaled in the side frames 1 and 2 works in conjunction with the arm 29 to act as a brake to prevent the inertia of rotation of the tape from pulling the tape 23 back toward the tape supply roll 10. The arm 29 is pivoted on the ears 30 protruding and loosely fitting into the holes 31 in the side frames 1 and 2. The arm 29 is tensioned by the spring 32 and so proportioned to make it more difficult for the tape 23 to be pulled back toward the tape supply roll 10 than forward in its normal manner. The spring 32 is anchored at its fixed end by looping around a pin 33 mounted between the side frames 1 and 2.

Pivotaly mounted between side frames 1 and 2 on shaft 34 which is supported by the side frames is the rear sector assembly 35. This assembly consists of side plates 36 between which is roller 37 and a presser element 38. The presser element is of such a nature as to engage and press or force forward the tape when making the seal. It may be of any suitable form and material such as metal, felt, rubber, plastic, etc. In the particular example of the invention illustrated, it is in the form of a roller, but this is not essential. The rollers shown are free to turn on shafts 39 and 40 respectively.

Also supported by the side plates 36 is the plate 41 which has ears 42 which protrude through holes in side plates 36. Clamped between the square washer 43 and the plate 41 by the rivet 44 is a resilient member 45. Under

roller 38 and toward the front of the machine the side plates 36 are bent inward to form a platform or movable abutment 46.

Pivotaly mounted between the side frames 1 and 2 forward of the rear sector assembly 35 on shaft 47 is the front sector assembly 48. This assembly consists of a tape carrier member 49 which is of U-shape and pivots on the shaft 47. This tape carrier 49 also has a tear-off blade 51 which is mounted in such a way that the tearing edge 51 makes an angle with the tape clamping portion 52 of the tape carrier member 49. Also mounted in the tape carrier member 49 is a stud 53.

Slidably mounted on shaft 47 and stud 53 and between the legs of the tape carrier 49 is the presser assembly 54. This assembly consists of two side plates 55 between which is a presser element adapted to cooperate with the presser element 38 to seal the adjacent faces of the tape together. This element may be of any suitable form or material, but is illustrated as a roller 56 free to rotate on shaft 57. The side plates 55 have slots 58 and 59 which allow the presser assembly 54 to move back and forth and at the same time rotate about the shaft 47 slightly. Also fastened to the side plates 55 of the presser assembly 54 is the shaft 60. Anchored to the shaft 60 at one end and to the cotter pin 61 mounted in the tape carrier 49 at the opposite end is the spring 62. This spring 62 urges the presser assembly 54 upwards and in a counterclockwise direction with respect to the tape carrier (see Fig. 1). The shaft 47 limits the upward motion in the slot 58 and the stud 53 limits the counterclockwise rotation in the slot 59.

Since the rear sector assembly 35 and the front sector assembly 48 must operate in the proper relation to one another the motion of each should be controlled. This is accomplished in the form of the invention illustrated by the levers or links 63, 64 and 65. The lever 63 is spaced between the side plates 36 by spacer bushings 66 all mounted on stud 67. The lever 64 is spaced between the presser roll plates 55 by the spacer bushings 68 all mounted on the stud 53. The levers 63 and 64 meet and are attached to the lever 65 through the stud 69 which is riveted to the lever 65. The lever 65 is pivoted on the shaft 70 which is held between the side frames 1 and 2. Spacers 71 keep lever 65 in its proper position between frames 1 and 2. Acting as a stop for lever 65 is the sleeve 72 on the screw 73.

The spring 74 anchored in the hole 75 and on the screw 4 acts as the return spring urging the rear sector assembly 35 and the front sector assembly 48 into the normal position as shown in Figs. 1 and 2.

Operation of machine

At the start of the closure operation the tape 23 is positioned as shown in Fig. 2 where the end 78a of the tape 23 almost reaches the tear-off blade 50 (tacky side up). When the machine is to be used to seal the neck of a bag, the filled bag 77 is grasped in one hand and the open end 78 is grasped with the other hand, the end 78 of the bag having been previously twisted to produce a neck 76 of a generally circular cross section. The bag 77 is held in a horizontal position with the neck 76 held directly over the tape 23 at the slot 79. The neck 76 is pushed downward into the slot and pushes the tape 23 with it until it rests between the roller 38 and the platform or movable abutment 46 as shown at 76a in Fig. 2. Further downward motion of the bag neck 76 rotates the rear sector assembly 35 in a clockwise direction through pressure on the platform or movable abutment 46. Rotation of the rear sector assembly 35 causes the front sector assembly 48 to rotate in a counter clockwise direction by action of the levers 63, 64 and 65. This brings rollers 38 and 56 into contact over the top of the bag neck 76 wrapping the tape 23 around the neck 76 as shown in Fig. 3. The presser roll assembly 54 being

urged against the roller 38 by the action of the spring 62 causes the tape 23 to adhere to itself since the tacky sides of the tape 23 are face to face.

When the neck of the bag is pressed against the tacky surface of the tape, as shown in Fig. 2, the tape adheres to the bag neck so that as the bag neck is pushed down with the platform 46, the tape is drawn from the supply roll 10, so as to complete the loop of tape around the bag neck and provide a length of tape sufficient for the next operation of the machine. As the bag neck is moved down slightly beyond the position shown in Fig. 3, the serrated knife edge 51 engages the tape, but at first not with sufficient force to sever the tape. Further movement of the bag neck thus causes the tape to draw the points of the cutter along with it and thus to continue the downward movement of the roller 56. The depression of the front sector assembly 48 and its slight rotation in a counterclockwise direction about the pin 47 further pulls the levers 64 and 63, thus continuing the clockwise movement of the rear sector assembly 35, and thereby eventually moving the platform 46 away from the bag neck as shown in Fig. 4. The rollers 56 and 38 further move slightly below the dead center position shown in Fig. 3 so that the roller 56 is pushed towards the left and swung in a slightly clockwise direction under the influence of spring 62. This causes the roller 56 to roll a little way around or under the periphery of the roller 38 to the position shown in Fig. 4 and it thereby rolls the looped part of the tape against the main strip of tape over a small length so as to increase the firmness of the adhesive bond. At the same time the further downward movement of the front and rear sector assemblies described brings the clamping portion 52 of the front sector assembly and the resilient member 45 of the rear sector assembly together so as to cause them to clamp the tape firmly between them. Also the cutting edge 51 is now forced through the tape below the point at which it is clamped, thereby cutting off the sealed bag neck from the tape strip, as clearly shown in Fig. 4. The platform 46 is now sufficiently moved from below the bag neck as to permit the latter to be drawn down to the clearance hole 81 at the bottom of the slot 79. This downward motion draws the ends of the severed sealing strip between the rollers 38 and 56 so as to complete the seal and the bag neck is now drawn out of the clearance hole and removed from the machine. This whole operation is done by a single continuous downward and lateral movement of the bag neck.

As soon as the bag is removed, the spring 74 pulls the levers 63, 64 and 65 back to initial position. At the start of the return movement it will be seen that the end of the tape 78a adheres to the clamping portion 52 against which it has been pressed by the resilient member 45. Just before the sectors reach their initial position, the end of the tape is bent back upon itself but is still adhered to the clamping portion 52 as indicated in Fig. 5. During the final movement, however, the tape is stripped off, and thus also given a curl or kink as shown in Figs. 1 and 2, and comes to rest upon the rollers 37 and 56 as shown in Fig. 1. The curl on the end of the tape helps it to maintain its position.

When the resilient member 45 clamps the tape against clamping portion 52 (Fig. 4) further rotation of the sector assemblies is prevented, as well as any further downward motion of the clamped tape strip. The further downward motion of the bag neck in the hands of the operator causes the tape to be urged firmly against the serrated teeth on the tear-off blade so that the tape is severed at this point.

While certain preferred embodiments of the invention have been illustrated and described in detail, it is to be understood that changes may be made therein and the invention embodied in other structures. It is not, therefore, the intention to limit the patent to the specific con-

5

structions illustrated, but to cover the invention broadly in whatever form its principles may be utilized.

We claim:

1. In a machine for applying an adhesive tape band, means for holding a tape supply, movable front and rear sector assemblies each carrying a tape clamping element, means for guiding an article to which the tape is to be applied between said elements, a platform carried by one of said sector assemblies over which the tape passes tacky side up and against which the non-tacky side of the tape is pressed by the article when moved between said elements, linkage connected to the sector assemblies for causing the sector assemblies to move when the article is pressed against the tape on the platform thereby depressing the platform, said linkage causing said elements to be moved towards each other so as to form a loop of tape around the article and a cutting knife carried by one of the tape clamping members for cutting off the tape below the point at which it is clamped.

2. In a machine for applying adhesive tape in loop form around an article, side frames having matching slots therein, said slots having wall portions for guiding the article and terminating in enlarged clearance holes, a rear sector assembly pivotally mounted between the side frames at one side of said guide slots, said sector assembly carrying at least one tape guiding roller, a platform adapted to extend across said slots and a tape clamping member, a front sector assembly pivotally mounted between the side frames in front of said guide slots, said front sector assembly including a tape carrier sub-assembly and a presser roller sub-assembly, said presser roller sub-assembly being capable of slight pivotal movement about the pivot upon which the front sector assembly is pivoted between the side frames, said presser roller sub-assembly also being capable of slight movement lengthwise of said tape carrier sub-assembly, said presser roller sub-assembly carrying a roller adapted to cooperate with the roller on the rear sector assembly so as to press the tape in loop form around the article to which the tape is to be applied, a spring for connecting said presser roller sub-assembly to said tape carrier sub-assembly, said tape carrier sub-assembly carrying a clamping member having an angular clamping face adapted to cooperate with the clamping member on the rear sector assembly so as to clamp the ends of the tape above a loop formed around the article, said angular clamping member carrying a serrated cut-off blade adapted to cut the tape below the place at which it is clamped between the clamping members so as to separate the article with the loop of tape thereon from the tape supply and permit it to be withdrawn through the clearance holes, a pair of links each pivoted at one end to a pivot on the front and rear sector assemblies respectively, said pivots being at a distance from the pivots by which the respective sector assemblies are pivoted between the side frames, said links being connected to a common pivot at their other ends, a third link connected to said common pivot and pivoted at its other end to the side frames, and a spring connected to said linkage to restore the linkage and sector assemblies to initial position after each operation of the machine.

3. In a machine for applying adhesive tape in loop form around an article, side frames having guide slots therein, a rear sector assembly pivotally mounted between the side frame at one side of said guide slots, said sector assembly carrying at least one tape guiding roller, and a tape clamping member, a front sector assembly pivotally mounted between the side frames in front of said guide slot, said front sector assembly including a tape carrier sub-assembly and a presser element sub-assembly, said presser element sub-assembly being capable of slight pivotal and lengthwise movement relative to the front sector assembly, said presser element sub-assembly carrying a presser element adapted to cooperate with the

6

roller on the rear sector assembly so as to press the tape in loop form around the article to which the tape is to be applied, said tape carrier sub-assembly carrying a clamping member having a clamping face adapted to cooperate with the clamping member on the rear sector assembly so as to clamp the end of the tape above the loop formed around the article, said clamping member carrying a cut-off blade adapted to cut the tape below the place at which it is clamped between the clamping members so as to separate the article with the loop of tape thereon from the tape supply, and means for operating said sector assemblies.

4. In a machine for applying adhesive tape in loop form around an article, side frames having matching slots therein, said slots having wall portions for guiding the article and terminating in enlarged clearance holes, a rear sector assembly pivotally mounted between the side frames at one side of said guide slots, said sector assembly carrying at least one tape pressing element, a platform adapted to extend across said slots and a tape clamping member, a front sector assembly pivotally mounted between the side frames in front of said guide slots, said front sector assembly including a presser element adapted to cooperate with the presser element on the rear sector assembly so as to press the tape in loop form around the article to which the tape is to be applied, said front sector assembly carrying a clamping member having a face adapted to cooperate with the clamping member on the rear sector assembly so as to clamp the end of the tape above the loop formed around the article, said clamping member carrying a cut-off blade adapted to cut the tape below the place at which it is clamped between the clamping members so as to separate the article with the loop of tape thereon from the tape supply and permit it to be withdrawn through the clearance holes, and a linkage connecting the front and rear sector assemblies.

5. In a machine for applying adhesive tape in loop form around an article, side frames having guide slots therein, a first presser element mounted at one side of said guide slots, a movable abutment adapted to extend into the path of an article passed through said slots and to be moved by engagement with said article, a second presser element adapted to cooperate with the first presser element so as to press tape in loop form around the article to which the tape is to be applied, an operative connection between said movable abutment and at least one of said presser elements, the range of movement of the abutment being sufficient to cause a length of tape to be fed long enough to form a loop around the next article to be sealed when the article in process of being sealed is pressed so as to engage a strip of tape extending above said abutment and forced down with the tape and abutment to the limit of downward movement of the abutment, the slots being sufficiently deep to permit the article being sealed to be moved to a point below the abutment, means for clamping the tape and stopping its movement after the loop of tape has been completed around the article and means for severing the tape upon movement of the article with the tape loop thereon into the lower part of said slots.

6. In a machine for applying adhesive tape in loop form around an article, side frames having guide slots therein, a first presser element mounted at one side of said guide slots, a movable abutment adapted to extend into the path of an article passed through said slots and to be moved by engagement with said article, a second presser element adapted to cooperate with the first presser element so as to press tape in loop form around the article to which the tape is to be applied, an operative connection between said movable abutment and at least one of said presser elements, the range of movement of the abutment being sufficient to cause a length of tape to be fed long enough to form a loop around the next article to be sealed when the article in process of being sealed is pressed so as to engage a strip of tape extend-

7

ing above said abutment and forced down with the tape and abutment to the limit of downward movement of the abutment, the slots being sufficiently deep to permit the article being sealed to be moved to a point below the abutment, means for clamping the tape and stopping its movement after the loop of tape has been completed around the article, means for severing the tape upon movement of the article with the tape loop thereon into the lower part of said slots, and means for engaging the severed end of the tape strip and moving it into a position so that the tape extends across the upper ends of the slots after the completion of the severing operation.

7. In a machine for applying adhesive tape in loop form around an article, side frames having deep narrow guide slots therein, a first presser element movably mounted at one side of said guide slots, a movable abutment adapted to extend into the path of an article passed through said slots and to be moved by engagement with said article, a sector assembly pivotally mounted between the side frames at the opposite side of said guide slots from said first presser element, a second presser element carried by said sector assembly adapted to cooperate with the first presser element so as to press tape in loop form around the article to which the tape is to be applied, and an operative connection between said movable abutment and said sector assembly, the slots being sufficiently deep to permit the article being sealed to be moved to a point below the abutment, means for clamping the tape and stopping its movement after the loop of tape has been completed around the article, means carried by the sector assembly for severing the tape upon movement of the article with the tape loop thereon into the lower part of said slots, and means carried by the sector assembly for engaging the severed end of the

8

tape and moving it into a position so that the tape extends across the upper ends of the slots after the completion of the severing operation.

8. In a machine for applying adhesive tape in loop form around an article, means for holding a supply of tape, a movable abutment movable by manual application of the article to be taped thereto, means for guiding the tape from the supply source in a path adjacent to the abutment with its adhesive side exposed where it will be engaged by the article when moved against the abutment, means operative upon movement of the abutment by the article for bringing the end of the tape around the article and adhering it to the tape coming from the supply so as to form a sealed loop around the article, a cutter, and operative connections between the movable abutment and the cutter for cutting the tape between the article taped and the source of supply after movement of the abutment and article through a sufficient distance to draw a length of tape from the supply long enough to form a loop for the succeeding article.

References Cited in the file of this patent

UNITED STATES PATENTS

25	883,690	Blythe	Apr. 7, 1908
	926,508	Paterson	June 29, 1909
	1,025,312	Rydquist	May 7, 1912
	1,640,043	Leidecker	Aug. 23, 1927
30	2,536,455	Miller et al.	Jan. 2, 1951
	2,645,286	Boyd	July 14, 1953
	2,651,900	Heilman	Sept. 15, 1953
	2,738,747	Derrick	Mar. 20, 1956
	2,762,179	Young	Sept. 11, 1956