Dec. 8, 1959 E. H. SCHIEFER 2,916,079

PORTABLE HAND TAPE FOLDER

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FIG. 1.

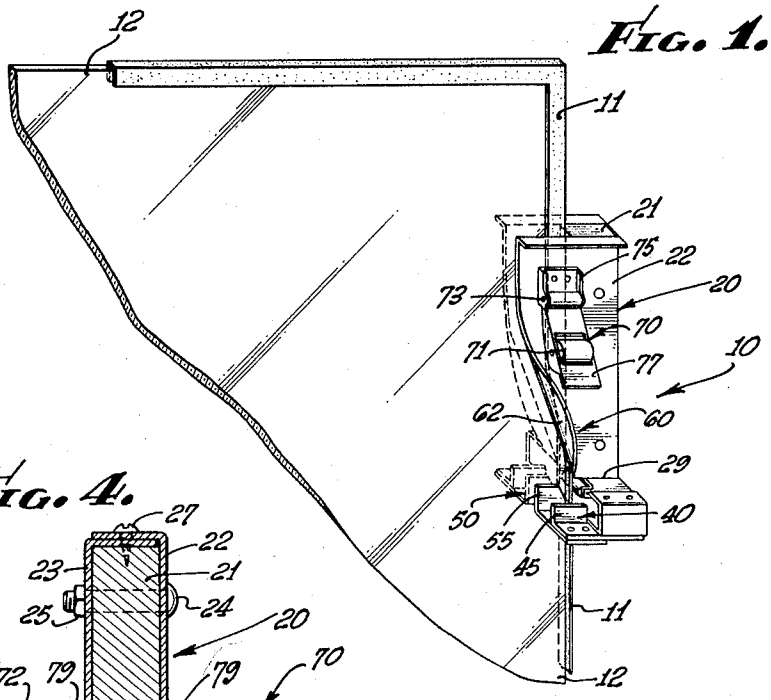


FIG. 4.

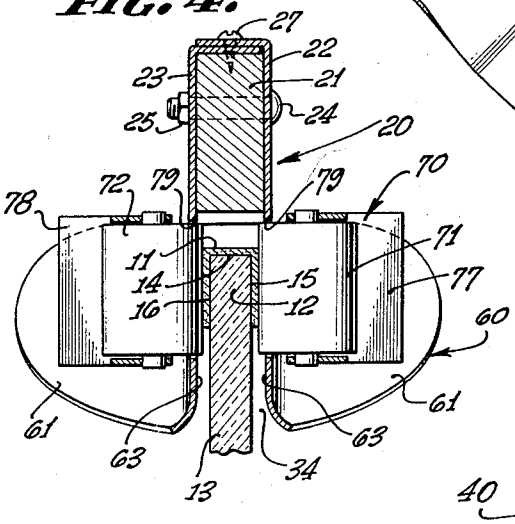


FIG. 6.

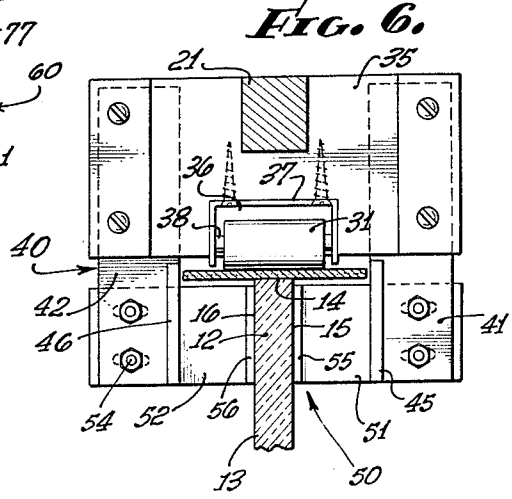
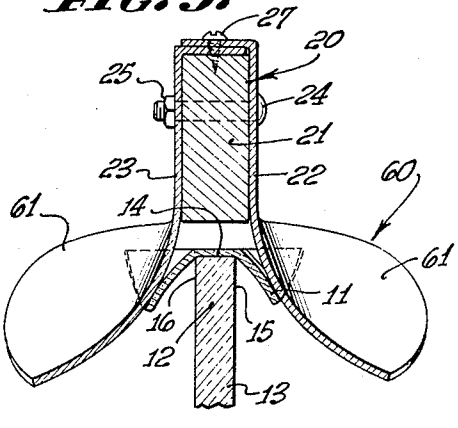


FIG. 5.



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FIG. 3.

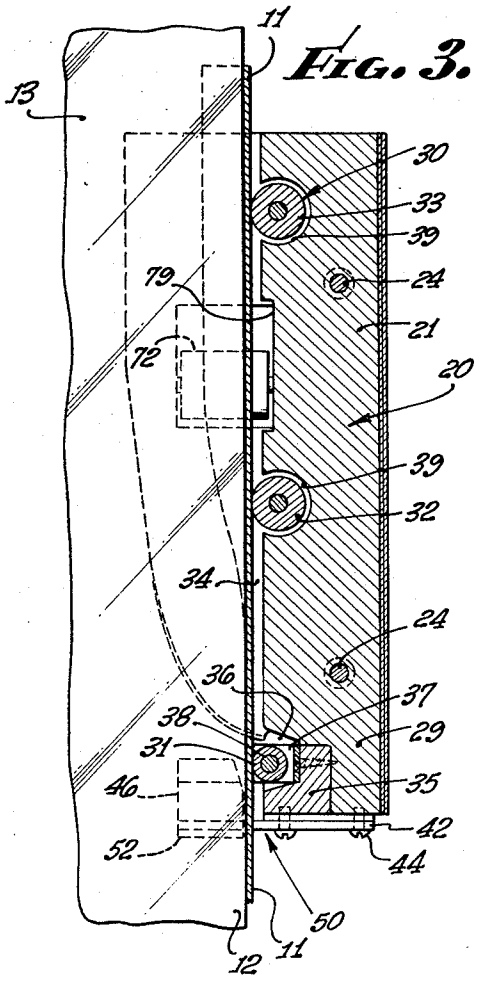


FIG. 2.

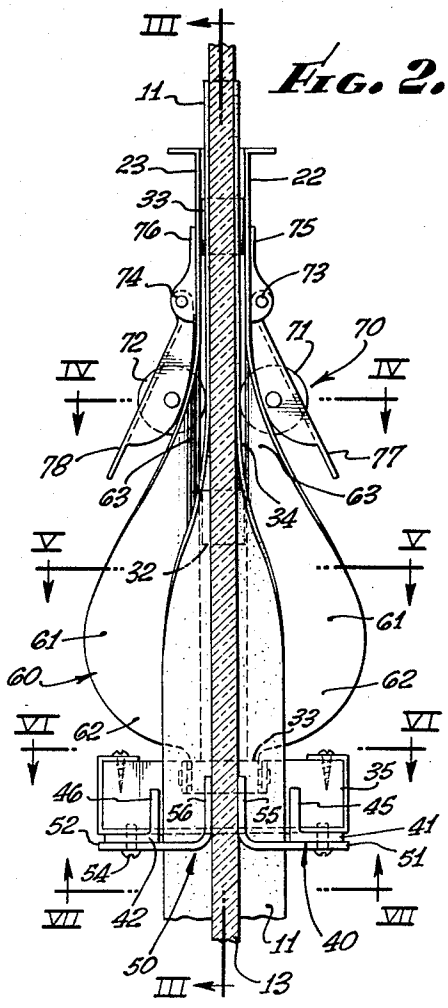
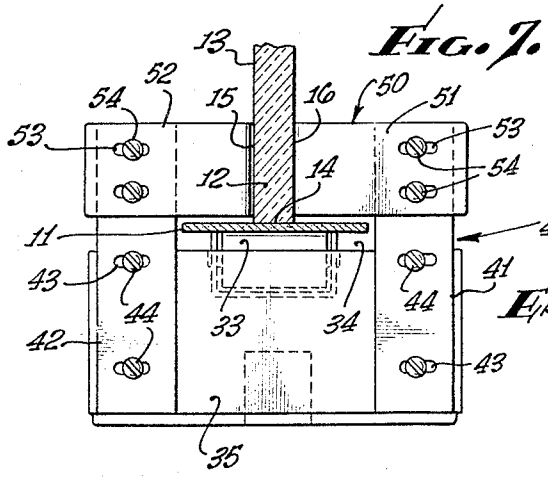


FIG. 1.



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United States Patent Office

2,916,079

Patented Dec. 8, 1959

2,916,079

PORTABLE HAND TAPE FOLDER

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Application December 18, 1957, Serial No. 703,672

5 Claims. (Cl. 154—1.8)

The present invention relates to a portable, hand operated, tape folding applicator and more particularly to the type which folds and applies adhesive tape around the marginal portions of sheet material.

Flat adhesive tape is applied around the marginal portions of sheet material for various industrial purposes, such as to provide fluid seals, to eliminate vibration, to compensate for temperature changes, etc. Many different sheet materials such as glass, plywood, metal, plastic, fiberboard, etc. are so treated. The tape is generally provided to the user in a roll for ease of handling, and presents various problems when attempted to be folded and applied around the marginal portions of sheet material by using known devices. In the past, the tape applying devices were not portable and also were not adapted to be used in an assembly line for mass production of panels or plates of sheet material having adhesive tape around their marginal portions. In addition, these known devices would not apply the tape in a flat, smooth condition on the sides and edges of the marginal portions of the sheet material and bulges and ripples in the tape would be present. When it is considered that the marginal portions of the sheet material are often pressed into engagement with or seated within a channel member or the like, the bulges or ripples in the tape would act as obstructions and be torn or ripped, thereby impairing the desired function.

Moreover, the known devices were extremely slow in applying the tape around the marginal portions of sheet material and workers in this field found the time for applying the tape was reduced by using hand methods. However, there are limitations in using the hand method and as a result there was no known device for applying the tape around the marginal portions of the sheet material which was fast and presented the tape in a smooth, unrippled condition.

In the present invention, a portable, hand operated, tape folding applicator is provided which folds and applies adhesive tape around the marginal portions of sheet material in considerably less time than any known device and in a tighter, smoother and evener condition. The applicator has a longitudinal body adapted to be held in the palm of an operator's hand and having a longitudinally extending guide channel, opposing transversely adjustable centering means mounted on the forward end of the body adapted to slidably receive a marginal portion of sheet material, transversely adjustable tape inlet means carried on the forward end of the body for centering and accommodating varying width tapes passing into the guide channel, a plurality of transversely extending edge rollers rotatably mounted on the body in longitudinally spaced relation and adapted to roll tape into contact with the edge of a marginal portion of a sheet material, a plane tangential to the periphery of the rollers forming the bottom of the guide channel adapted to receive the marginal portion of the sheet material, a pair of opposing tape folding means carried by the body, each folding means including a forward portion virtually parallel to

the bottom of the guide channel, the rear portions of the folding means defining side walls of the rear portion of the guide channel and substantially vertical to the bottom of the guide channel, a pair of opposing smoothing rollers carried by the rear portion of the device, means mounting each smoothing roller for rotation about an axis perpendicular to the bottom of the guide channel, and means biasing each mounting means toward the other mounting means, the smoothing rollers being carried by the device in proximity to at least one of the transversely extending edge rollers. The applicator automatically positions, folds and applies the tape around the marginal portions of the sheet material without having to stop and center the tape as must be done when the hand method is used. Also, by providing smoothing rollers on the applicator the sides of the tape are pressed against the side faces of the marginal portions of the sheet material and bulges or ripples are not present after the tape has been applied.

An object of the present invention is the provision of a light-weight tape folding applicator which is portable and easily handled in the palm of the hand of the operator.

Another object is to provide a portable, hand operated, tape folding applicator which folds and applies tape to the marginal portions of sheet material in considerably less time than any known device.

A further object of the invention is the provision of a portable, hand operated, tape folding applicator for folding and applying adhesive tape around the marginal portions of sheet material in a smooth, tight and even condition without any bulges or ripples being present.

Still another object is to provide a portable, hand operated, tape folding applicator which is inexpensive to produce and simple to use.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 shows a perspective view of a preferred embodiment of the present invention in position for folding and applying tape to a sheet of material.

Fig. 2 illustrates a bottom view of the device shown in Fig. 1.

Fig. 3 shows a longitudinal section of the device taken along plane III—III of Fig. 2.

Fig. 4 illustrates a transverse section of the device taken along plane IV—IV of Fig. 2.

Fig. 5 shows a transverse section of the device taken along plane V—V of Fig. 2.

Fig. 6 illustrates a transverse section of the device taken along plane VI—VI of Fig. 2.

Fig. 7 is an end view of the device from line VII—VII of Fig. 2.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in Fig. 1 an elongated, compact, portable, hand operated, tape folding applicator **10** of the present invention in position for folding and applying tape **11** to the marginal portions **12** of a sheet of material **13**. As best seen in Fig. 6 the marginal portion **12** of the sheet material **13** has an edge face **14** and side faces **15** and **16**.

The applicator **10** has a body **20** adapted to be held in the palm of an operator's hand, edge roller means **30** positioned on the body **20** for forcing the tape **11** into contact with the edge face **14** of the marginal portion **12** of the sheet material **13**, a plane tangential to the periphery of the rollers forming the bottom of a guide channel adapted to receive the marginal portion **12**, adjustable means **40** mounted on the forward end of the body **20** for slidably receiving the marginal portion of the sheet material, a pair of opposing trans-

versely adjustable tape inlet means 50 mounted on the front end of the body 20 for centering and accommodating varying width tapes passing into the applicator, a pair of opposing tape folding means 60 carried by the body, and opposing tape smoothing means 70 carried by the rear portion of the body 10 for smoothing the sides of the tape 11 into engagement with the sides 15 and 16 of the marginal portion 12.

The longitudinal body 20 includes a center section 21 and spaced sides 22 and 23 detachably secured on either side of the center section 21 by any suitable means, such as a screw 24 (Figs. 4 and 5) passing through the side 22, center section 21 and side 23 and receiving the nut 25. As best seen in Figs. 4 and 5, the sides 22 and 23 have inwardly facing overlapping flanges, which extend toward each other and around the upper end 26 of the body 20. Screws 27 pass through suitable slotted openings in the flanges to also detachably secure them against the upper end of the center section in order to receive varying width center sections 21; thus, the applicator 10 is adapted to receive a sheet of material 13 of varying thicknesses.

The body 20 has a forward or feeding end 29 and a rear or outgoing end. The center section 21 and sides 22 and 23 can be made of any suitable material such as, wood, metal, or plastic, but preferably the center section 21 is made of wood and the sides 22 and 23 are made of metal plates.

As the marginal portion 12 of the sheet material 13 and the tape 11 pass through the applicator 10, a plurality of transversely extending edge roller means 30 (Fig. 3) are provided which are rotatably mounted on the body 20 in longitudinally spaced relation and are adapted to roll the tape 11 into contact with the edge 14 of the marginal portion 12 of the sheet material 13. The edge roller means 30 can best be seen in Fig. 3, as a plurality of transversely extending rollers 31, 32, and 33. A plane tangential to the periphery of the rollers 31, 32, and 33 forms the bottom of a guide channel 34 which receives the marginal portion 12 of the sheet material 13 and the tape 11. It is thus seen that the tape 11 is rolled into contact with the edge 14 of the marginal portion 12 by the periphery of the rollers 31, 32, and 33 is the material 13 passes through the applicator 10.

As seen in Fig. 3, the forward end of the center section 21 has been reduced in height to receive an L-shaped block 35. The block 35 mates with the center section 21 in a manner providing a space 36 therebetween. Within this space 36, an upwardly, facing U-shaped member 37 is fixed to the block 35 by any suitable means. The roller 31 is rotatably mounted on a shaft 38 which has its ends fixed on the legs of the U-shaped member 37. The center section 21 is provided with suitable openings 39 having suitable shafts mounted therein to rotatably mount rollers 32 and 33 thereon. The upper peripheries of all of the rollers 31, 32, and 33 extend below the lower surface of the center section 21 to rollably force the adhesive side of the tape 11 into binding engagement with the edge face 14 of the marginal portion 12 of the sheet material 13.

On the forward end or feeding end 29 of the body 20, there are provided means 40 which is adjustably mounted thereon for centering and accommodating varying width tapes 11 passing into the guide channel 34. Referring to Figs. 2 and 7, a pair of upwardly extending plates 41 and 42 are adjustably mounted on the front end 29 of the body 20 by means of horizontal slots 43 therethrough which receive screws 44. By loosening the screws 44, the plates 41 and 42 can be adjusted inwardly or outwardly, as best seen in Fig. 7, to either center the tape 11 passing into the forward end of the guide channel 34, or position the tape 11 on either side of the center line of the guide channel 34. Referring to Figs. 2 and 6, it can be seen that the inner edges of the upper portions of the plates 41 and 42 are provided with rearwardly extending flanges 45 and 46, respectively, which guide the tape 11 into the guide channel 34.

Means 50 are also adjustably mounted on the front or feeding end 29 of the body 20 for centering and accommodating varying thicknesses of the sheet material 13 passing into the guide channel 34. Referring to Figs. 2 and 7, plates 51 and 52 are adjustably mounted on the upper ends of the plates 41 and 42, respectively, by means of horizontal slots 53 receiving suitable screws 54. Plates 51 and 52 are also provided with rearwardly flanges 55 and 56, respectively (Fig. 2) which aid in guiding and centering sheet material 13 passing into the forward end of the guide channel 34. It is thus seen that varying thicknesses of sheet material 13 can be received within the guide channel 34 by simply adjusting plates 51 and 52 by means of the screws 54.

A pair of opposing tape folding means 60 is carried by the body 20 rearwardly of the forward end 29 for folding the tape 11 upon itself around the marginal portion 12 of the sheet material 13 as it passes into the applicator 10. These folding means are wings or folders 61 (Fig. 2) and include forward portions 62 (Fig. 2) extending substantially parallel to the bottom of the guide channel 34 and rear portions 63 (Fig. 4) which define side walls of the guide channel 34 and extend substantially perpendicular to the bottom of the guide channel 34. The wings 61 are thus flared and tapered, rearwardly and upwardly, to form the opening or rear portion of the channel 34 provided between the rear portions 63 of the wings 61 (Fig. 4). It is best seen in Figs. 2 and 5, that the widest opening between the wings 61 is adjacent the forward end of the body 20 and the narrowest opening between the wings 61 extends rearwardly, at approximately the center of the body 20. Referring to Figs. 2 and 5, when the tape 11 moves through the channel 34, the sides of the tape engage the sides of the wings 61 and following its taper and flare is gradually folded around the marginal portion 12 of the sheet material 13 (Fig. 5) until the sides of the tape 11 are in the position shown in Fig. 4.

Means 70 are provided on the rear end of the body 20 for pressing the sides of the tape 11 into engagement with the side faces 15 and 16 of the marginal portion 12 of the sheet material 13, after the tape 11 has been folded upon itself and around the marginal portion 12. This means is shown as a pair of opposing rollers 71 and 72 (Figs. 2 and 4) which are rotatably mounted on the body 20. These rollers 71 and 72 smooth the sides of the tape 11 against the side faces 15 and 16 of the marginal portion 12 of the sheet material 13. The means for mounting each of the smoothing rollers 71 and 72 for rotation about an axis perpendicular to the bottom of the guide channel 34 are hinges 73 and 74, respectively. Each of the hinges 73 and 74 have a fixed member 75 and 76, respectively, secured to the sides of the plates 22 and 23 and a movable member 77 and 78, respectively, which rotatably carries the rollers 71 and 72. The movable members 77 and 78 are pivotally connected to members 75 and 76 and are resilient, biasing the rollers 71 and 72 towards each other so that they meet at a point approximately along the center line of the guide channel 34. Suitable openings 79 are provided in the sides of the plates 22 and 23 to allow the rollers 71 and 72 to pass therethrough and into mating position. The free ends of the biasing movable members 77 and 78 are adapted to be grasped by the thumb and index finger of the hand of the operator in order to apply additional pressure to the rollers 71 and 72 whenever desired. As best seen in Figs. 2 and 4, the rollers 71 and 72 are wedged apart as the sheet material 13 having the tape 11 folded around the marginal portion 12 passes through the applicator 10. As stated hereinabove, if the resilient movable members 77 and 78 of the hinges 73 and 74, respectively, do not exert sufficient pressure

to force the sides of the tape **11** into engagement with the sheet material **13**, the operator can apply additional manual pressure by squeezing the movable members **77** and **78** inwardly.

In preparing to use the applicator **10**, the body **20** is held in the palm of the hand of the operator while the tape **11** is supplied to it from a roll which can be positioned on an adjoining table or on the floor or in some instances can be journaled onto a suitable bracket and shaft carried by the applicator **10**. The sheet of material **13** around which the tape **11** is to be folded and applied can be laid flat on a table or the like, with a marginal portion **12** which is to be taped, extending over the edge of the table. In operation, the operator places his thumb on the manual movable member **77** and his index finger on the manual movable member **78**, while the palm of his hand is wrapped around the upper end and sides of the body **20**. In this position, the operator can exert any amount of desired auxiliary pressure, by merely pressing the movable members **77** and **78** against the sides of the tape **11** passing through the rollers **71** and **72**. The tape **11** is now pulled from the roll by the left hand of the operator and fed into the feeding end **29** of the applicator **10** far enough to rest on the roller **31**.

The applicator with the tape in this position is now positioned on the marginal portion **12** of the sheet material **13**, as shown in Fig. 1. The adhesive side of the tape **11** is forced into binding engagement with the edge face **14** of the marginal portion **12** of the sheet material **13**, as best seen in Fig. 6, by the roller **31**. The operator now pulls the tape applicator towards him over the tape **11** with constant pressure on the body **20** towards the edge face **14** of the marginal portion **12** of the sheet material, and as the applicator progresses, the sides of the flat tape **11** come in contact with the wings or folders **61** and start to fold toward the side faces **15** and **16** of the marginal portion **12**, as best seen in Fig. 5. The unadhesive surface of the tape **11** now contacts the roller **32** which keeps the tape from bulging at the corners of the edge face **14** as the tape is folded upon itself. This is important as it must be remembered that some tapes are somewhat stiffer and have a tendency to bulge at the corners when being folded which causes tearing of the tape when the marginal portion **12** of the sheet material **13** is inserted into a channel like member.

Referring to Fig. 4, it is seen that the rollers **71** and **72** now engage and press the sides of the tape **11** against the side faces **15** and **16** of the marginal portion **12** of the sheet material **13**. These rollers **71** and **72** are wedged apart as the marginal portion **12** carrying the tape **11** attached thereto travels through the applicator **10**. Normally, the pressure of the resiliently urged rollers **71** and **72** is sufficient to adhere the sides of the tape **11** to the side faces of the marginal portion **12** of the sheet material **13**. However, as explained hereinabove, additional pressure can be exerted on the movable members **77** and **78** which in turn will transmit additional pressure to the rollers **71** and **72**, respectively. The smoothing rollers **71** and **72** are carried by the applicator in proximity to at least one of the transversely extending rollers, namely, roller **32**. The reason being that as the rollers **71** and **72** smooth the sides of the tape against the sides of the marginal portion **12**, the tape would tend to bulge outwardly at the edge face **14** of the marginal portion **12**. Thus by having the rollers **71** and **72** in proximity to the edge roller **32**, a smooth fold is presented around the marginal portion **12**. However, as seen in Fig. 3, an additional edge roller **33** is provided on the rear end of the applicator **10** to insure that the tape **11** is not bulged outwardly along the edge face **14** of the marginal portion **12** of the sheet material **13**. As seen in Fig. 1, the applicator **10** will move around the marginal portions **12** of the sheet material **13** and fold and apply the tape **11** thereto. However, it should be understood that the applicator **10** will not only apply tape **11** along a straight marginal edge of the sheet material **13**, but also around the corners of the sheet material **13**.

It is thus seen that a portable, hand operated tape folding applicator is provided which will fold and apply adhesive tape to the marginal portions of sheet material with a minimum of effort and time. Moreover, the tape will be automatically applied in a uniform manner around the sheet material without having to stop and continually center the sheet material or the tape. By using the applicator of the present invention, the time required for folding and applying tape to the marginal portions of sheet material, has been reduced by more than one-half of that needed for known tape applying devices.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

I claim:

1. A portable, hand type applicator for folding and applying adhesive tape continuously to the edge face and adjacent side faces of marginal portions and corners of sheet material without cutting the tape comprising: a longitudinal body adapted to be held in the palm of an operator's hand and having a longitudinally extending guide channel therein adapted to receive a marginal portion of sheet material and flat adhesive tape; a plurality of transversely extending edge rollers rotatably mounted on said body within the guide channel in longitudinally spaced relation and adapted to roll the tape into contact with the edge face of the marginal portion of the sheet material, a plane tangential to the periphery of said rollers forming the bottom of the guide channel adapted to receive the marginal portion of the sheet material; a pair of opposing transversely adjustable centering means at the forward end of said body adapted to slidably receive a marginal portion of the sheet material; a pair of opposing adjustable means mounted on the front end of said body for centering and accommodating varying width tapes passing into said guide channel; a pair of opposing tape folding means carried by said body, each folding means including a forward portion extending substantially parallel to the bottom of the guide channel, and a rear portion defining side walls of the rear portion of the guide channel and extending substantially perpendicular to the bottom of the guide channel; a pair of opposing smoothing rollers carried by the rear end of said body, means mounting each of said smoothing rollers about an axis perpendicular to the bottom of the guide channel; means biasing each mounting means toward the other mounting means, said smoothing rollers being carried by said applicator in proximity to at least one of said transversely extending edge rollers.

2. A portable, hand type applicator for folding and applying adhesive tape continuously to the edge face and adjacent side faces of marginal portions and corners of sheet material without cutting the tape comprising a longitudinal body adapted to be held in the palm of an operator's hand and having a longitudinally extending guide channel adapted to receive a marginal portion of sheet material and flat adhesive tape; edge means positioned on the bottom of the guide channel for forcing the tape into contact with the edge face of the marginal portion of the sheet material passing through the applicator; a pair of opposing transversely adjustable centering means at the forward end of said body adapted to slidably receive a marginal portion of sheet material; a pair of opposing transversely adjustable tape inlet means mounted on the front end of said body for centering and accommodating varying width tapes passing into said applicator; a pair of opposing tape folding

means carried by said body, each folding means including a forward portion extending substantially parallel to the bottom of the guide channel, and the rear portion of the folding means defining side walls of the rear portion of the guide channel and extending substantially perpendicular to the bottom of the guide channel; a pair of opposing smoothing rollers carried by the rear portion of said body, means mounting each of said smoothing rollers for rotation about an axis perpendicular to the bottom of said guide channel; means biasing each mounting means toward the other mounting means, and said smoothing rollers being carried by the applicator in proximity to said edge means positioned on the body of the guide channel.

3. A portable, hand type applicator for folding and applying adhesive tape continuously to the edge face and adjacent side faces of marginal portions and corners of sheet material without cutting the tape comprising: a longitudinal body adapted to be held in the palm of an operator's hand and having a longitudinally extending guide channel adapted to receive a marginal portion of sheet material and flat adhesive tape; a plurality of transversely extending edge rollers rotatably mounted on said body within said channel in longitudinally spaced relation and adapted to roll the tape into contact with the edge face of the marginal portion of sheet material, a plane tangential to the periphery of said rollers forming the bottom of the guide channel adapted to receive the marginal portion of the sheet material; a pair of opposing tape folding means carried by the forward portion of said body, each folding means including a forward portion extending substantially parallel to the bottom of the guide channel, and rear portions of the folding means defining side walls of the rear portion of the guide channel and extending substantially perpendicular to the bottom of said guide channel; a pair of opposing smoothing rollers carried by the rear portion of said body, means mounting each of said smoothing rollers about an axis perpendicular to the bottom of the guide channel; means biasing each mounting means toward the other mounting means, said smoothing rollers being carried by the body in proximity to at least one of said transversely extending edge rollers, and a pair of opposing transversely adjustable tape inlet means mounted on the front of said body for centering and accommodating varying width tapes passing into said guide channel.

4. A portable, hand type applicator for folding and applying adhesive tape continuously to the edge face and adjacent side faces of marginal portions and corners of sheet material without cutting the tape comprising: a longitudinal body adapted to be held in the palm of an operator's hand and having a longitudinally extending guide channel therein adapted to receive a marginal portion of sheet material and flat adhesive tape; edge means positioned on the bottom of the guide channel for forcing the tape into contact with the edge face of the marginal portion of the sheet material passing through the applicator; a pair of opposing tape folding means carried by the forward portion of said body, each folding means including a forward portion extending substantially parallel to the bottom of said guide channel, and rear portion of said folding means defining side walls of the rear portion of the guide channel and extending substantially perpendicular to the bottom of the guide channel; a pair of opposing smoothing rollers carried by the rear portion of said body, means mounting each of said smoothing rollers for rotation about an axis perpendicular to the bottom of the guide channel; means biasing each of said mounting means toward the other mounting means and said smoothing rollers being carried by the body in proximity to said edge means positioned on the bottom of the guide channel, and a pair of opposing transversely adjustable tape inlet means mounted on the front end of said body for centering and accommodating varying width tapes passing into the guide channel.

5. A portable, hand type applicator for folding and applying adhesive tape continuously to the edge face and adjacent side faces of marginal portions and corners of sheet material without cutting the tape comprising: a longitudinal body adapted to be held in the palm of an operator's hand and having a longitudinally extending guide channel therein adapted to receive a marginal portion of sheet material and flat adhesive tape; edge means positioned on the bottom of the guide channel for forcing the tape into contact with the edge face of the marginal portion of the sheet material passing through the applicator; a pair of opposing tape folding means carried by the forward end of said body for folding the tape upon itself around the marginal portion of the sheet material; a pair of opposing tape smoothing means carried on the rear end of the body for pressing and smoothing the sides of the tape against the side faces of the marginal portion of the sheet material; means biasing each of said tape smoothing means toward each other to allow the smoothing means to exert a pressure on the sides of the tape around the marginal portion of the sheet material whereby the tape is folded and applied around the marginal portion of the sheet material when the applicator is moved around the sheet material by the operator; a pair of opposing transversely adjustable centering means mounted on the forward end of said body adapted to slidably receive a marginal portion of sheet material passing into the guide channel; and a pair of opposing, transversely adjustable tape inlet means mounted on the front end of said body for centering and accommodating varying width tapes passing into the guide channel.

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