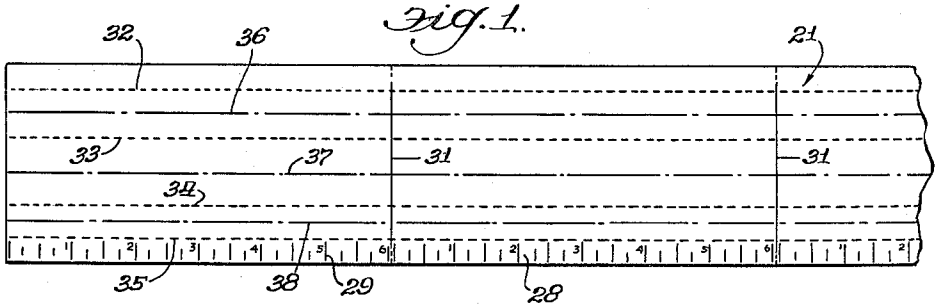
Dec. 25, 1962 W. F. CUNNINGHAM 3,070,482

INDEX TABS AND METHOD AND APPARATUS FOR MAKING THE SAME

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Fig. 1.



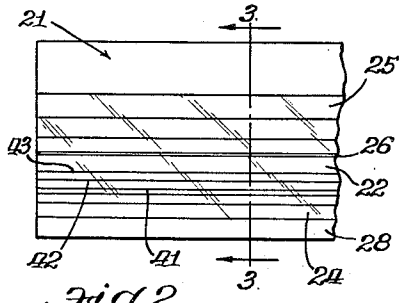


Fig. 2.

Fig. 3.

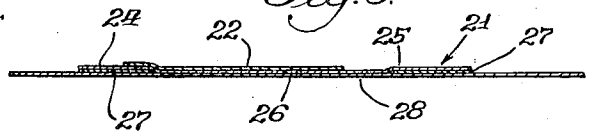


Fig. 4.

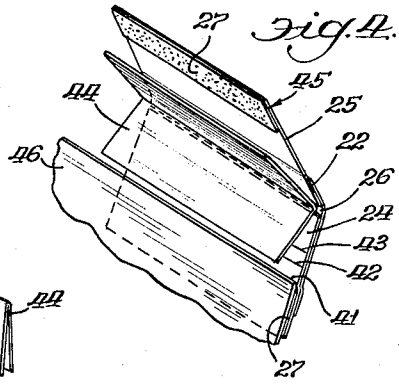
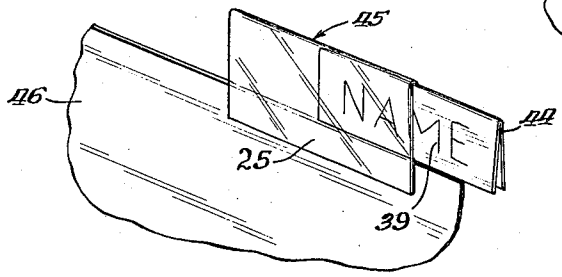


Fig. 5.



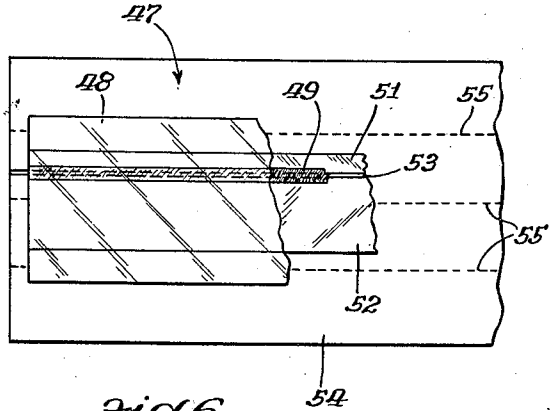
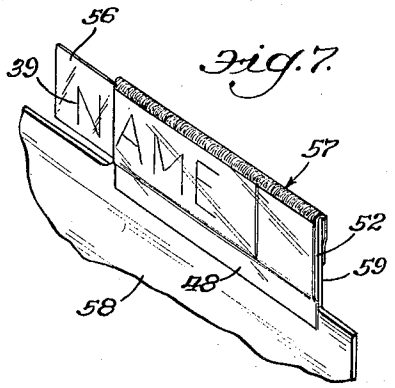


Fig. 6.

Fig. 7.



INVENTOR.

Walter F. Cunningham

BY

Horton, Davis, Brewer & Brugman

Atty's.

Dec. 25, 1962 W. F. CUNNINGHAM 3,070,482

INDEX TABS AND METHOD AND APPARATUS FOR MAKING THE SAME

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Fig. 8.

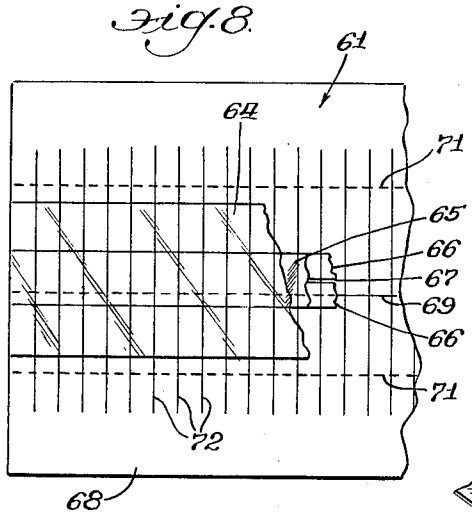
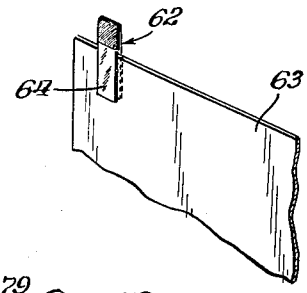


Fig. 9.



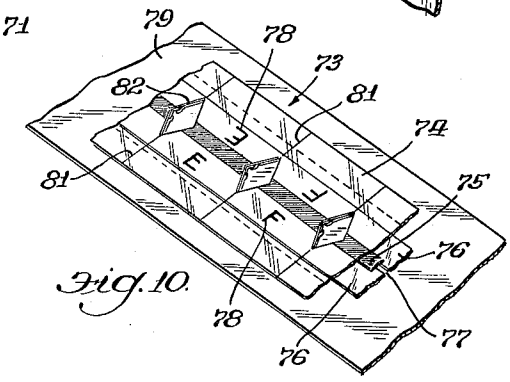


Fig. 10.

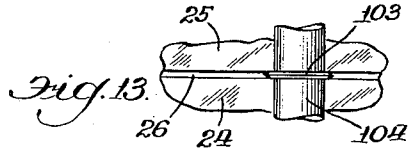
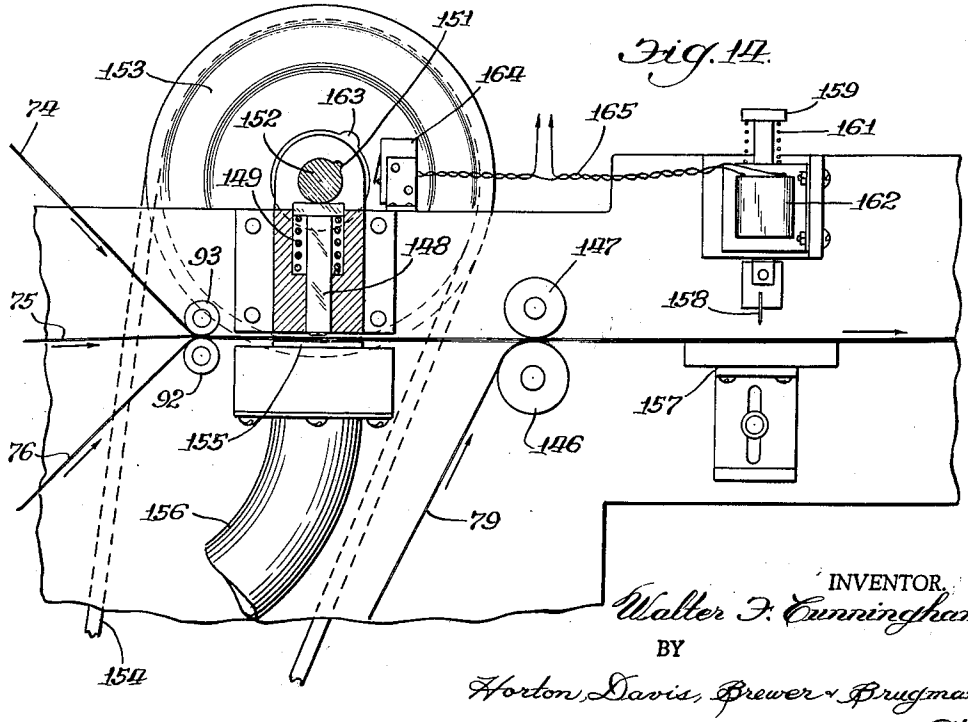


Fig. 13.

Fig. 14.



INVENTOR.
Walter F. Cunningham
BY
Horton, Davis, Brewer & Brugman
Attys

Dec. 25, 1962 W. F. CUNNINGHAM 3,070,482

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Fig. 12.

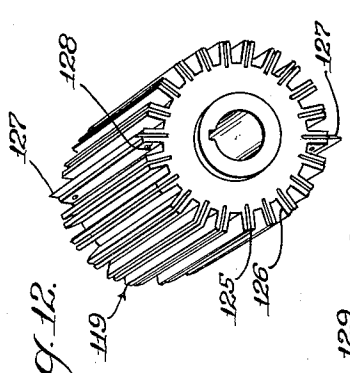


Fig. 11.

INVENTOR.

Walter F. Cunningham

BY

Horton, Davis, Brewer & Brugman

Attys.

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INDEX TABS AND METHOD AND APPARATUS FOR MAKING THE SAME

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Fig. 15.

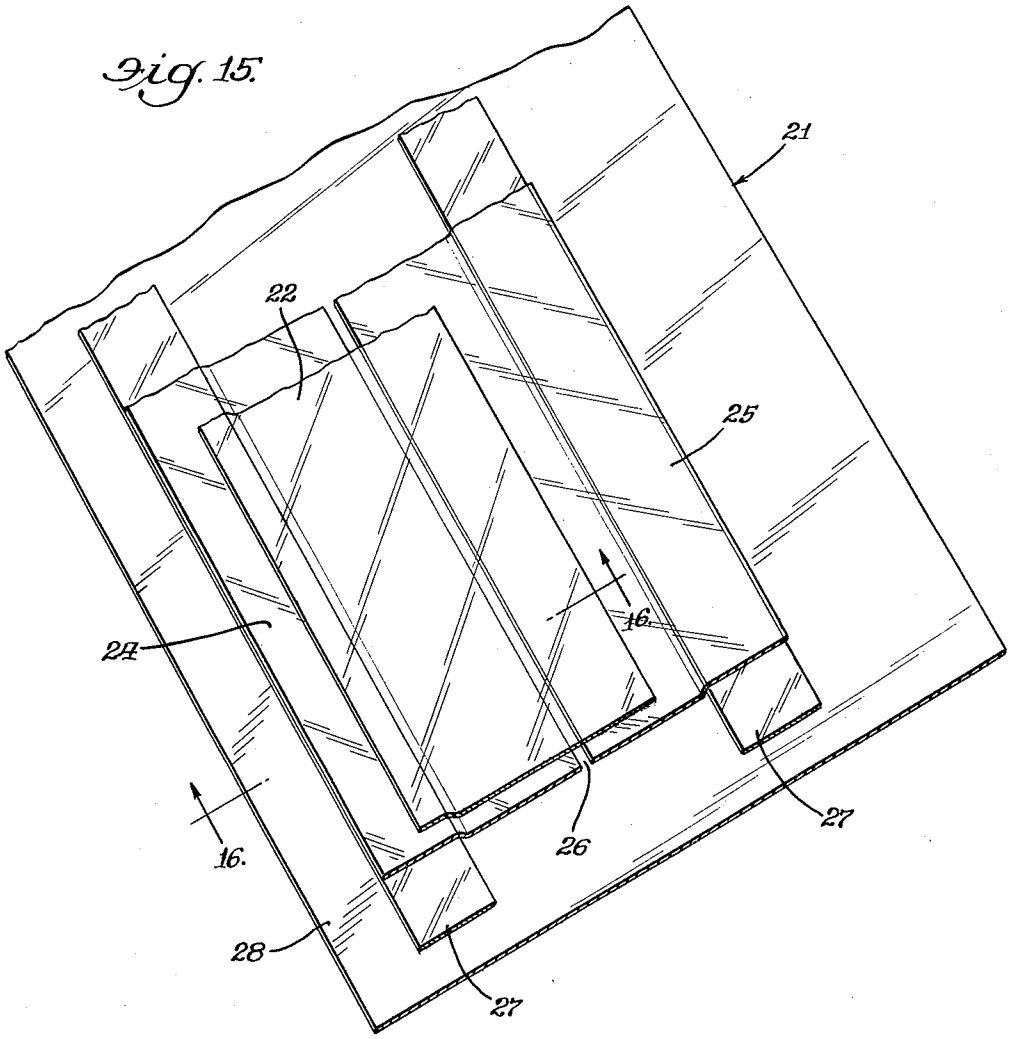
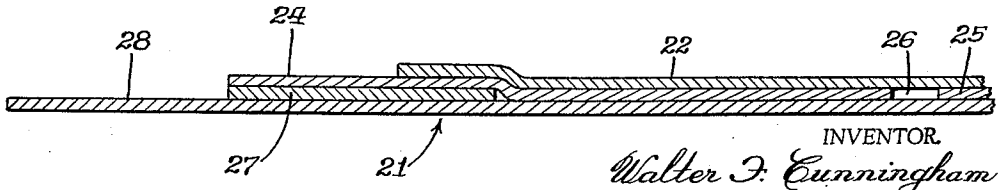


Fig. 16.



INVENTOR.
Walter F. Cunningham
BY
Horton, Davis, Brewer & Brugman
Attys.

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INDEX TABS AND METHOD AND APPARATUS FOR MAKING THE SAME

Walter F. Cunningham, Chicago, Ill., assignor to Superior Tabbies, Inc., Chicago, Ill., a corporation of Illinois

Filed Feb. 1959, Ser. No. 791,462
9 Claims. (Cl. 156—269)

This invention relates in general to index tabs, and more specifically to novel composite flexible strips providing improved separable tabs and a new apparatus and method for making the same.

A principal object of the invention is the provision of a composite flexible strip comprising separable index tabs having transparent skirt or wing portions detachably secured by pressure-sensitive adhesive to a mounting strip, with the tabs including parallel filler strips spaced from each other to define a hinge portion, whereby folding of a tab along such hinge portion, after removal from the mounting strip, will bring the filler strips into face-to-face relationship and enable attachment of the skirt portions to an edge portion of a sheet of paper, or the like, to present an accurately positionable, strong, smooth and flexible tab which does not require moistening for its attachment.

Another object of the invention is to provide such a composite strip in which the mounting strip readily may be employed as an insert for the tab.

A further object is the provision of such a composite strip from which tabs of desired length readily may be severed.

Another object is to facilitate selectively variable positioning of the tab to cause the filler strips to define an insert-receiving pocket of desired height above the edge of the sheet to which the tab is attached.

A further object is the provision of such a tab construction which may be employed as a file folder tab protector.

Another important object of the invention is the provision of a novel method of making such a composite strip accurately and economically.

Another object is to provide a new and simplified method for accurately mounting an index tab and an insert therefor at a selected position on the edge portion of a sheet of paper, or the like.

A further important object is to provide novel apparatus for making such a composite strip which is readily adjustable to vary selectively the specific characteristics of the different strips employed therein and their order of attachment to each other.

Other objects and advantages of the present improvements will be apparent from a consideration of the following specification wherein:

FIGURE 1 is a bottom plan view of a composite strip embodying the features of this invention;

FIG. 2 is a top plan view of an end portion of the composite strip of FIG. 1;

FIG. 3 is a transverse vertical section taken through the strip substantially on the line **3—3** of FIG. 2;

FIG. 4 is a perspective view of an indexing tab that has been severed from the strip of FIGS. 1–3 illustrating an intermediate step in the preferred method of attaching the same, with an insert, to the edge portion of a sheet of paper;

FIG. 5 is a view similar to FIG. 4 illustrating the index tab in its mounted position of use, with an insert partially removed therefrom;

FIG. 6 is a top plan view (similar to FIG. 2) of a portion of a modified composite strip, with various component strips thereof broken away at different points;

FIG. 7 is a perspective view showing a tab cut from the composite strip of FIG. 6 as applied as a file folder

tab protector, with an insert shown in a position partially removed therefrom;

FIG. 8 is a top plan view similar to FIGS. 2 and 6 of a further modified form of composite strip;

FIG. 9 is a perspective view showing one of the color indicating tabs removed from the strip of FIG. 8 and mounted for use on the edge portion of a sheet of paper;

FIG. 10 is a perspective view of a portion of another modified form of composite strip which provides a plurality of pre-printed index tabs;

FIG. 11 is a side elevation of a preferred form of apparatus for continuously making the composite strips of this invention;

FIG. 12 is a perspective view of a novel transverse cutter employed in the machine of FIG. 11;

FIG. 13 is a detail horizontal section taken substantially on the line **13—13** of FIG. 11;

FIG. 14 is a side elevation of a portion of a modified form of transverse cutting and punching mechanism that may be substituted for the cutter of FIG. 13 in the machine of FIG. 11;

FIG. 15 is an isometric view in exploded form with end portions of the various layers of the composite strip of FIGS. 1–3 separated and spaced vertically from each other; and

FIG. 16 is a transverse section like FIG. 3 of a portion of that composite strip greatly enlarged.

Referring more particularly to FIGURES 1 through 5, one form of index is therein disclosed which embodies the features of this invention. FIGURES 1, 2 and 3 illustrate that such index or a plurality thereof may be formed either as a single "blank" or a "blank" strip intended for sale in folded or rolled form and adapted to be cut transversely to provide index tabs of any selected length. FIGURE 1 illustrates the bottom or reverse side of this blank strip **21**, while the obverse side thereof is shown in FIGURE 2, which is that side that is exposed as the outer portion of the index tab in its final position of use, as in FIGURE 5.

The blank **21** is made up of four different plies. The first of these comprises a base member or backing strip **22** of a transparent polyester film, such as the DuPont film marketed under the trademark "Mylar," which is provided with a suitable coating of clear, pressure-sensitive adhesive over its entire inner surface. This inner surface of the backing strip **22** is the lower surface thereof as seen in FIGURE 3. The second or next ply of the blank strip **21** comprises a transparent cellulose strip **23** (FIGURE 11), which is split longitudinally and separated (in a manner later to be described) to form two parallel filler members or strip portions **24** and **25** that are adhered to the inner or lower adhesive surface of the backing strip **22**, extend laterally therebeyond, and are spaced from each other to expose a narrow longitudinally extending portion **26** of the adhesive covered surface of the backing strip **22**. This portion **26** of the backing strip may be used for tab-retaining purposes, in a manner later to be described, and also comprises the hinge portion of the instant foldable index tab.

The third or next lower ply of the blank strip **21** comprises two marginal strips **27** having a suitable transparent and pressure-sensitive adhesive coating on both sides and adhered to the outer marginal portions of the cellulose strips **24** and **25** on their lower or inner surfaces. The fourth or lower ply of the blank strip **21** comprises a mounting strip **28** of a suitable polyethelene-impregnated release paper to which the lower or exposed surface of the marginal strips **27** are temporarily adhered and from which the same may readily be separated when a portion of the blank strip **21** is to be employed for index tabbing purposes.

As best seen in FIGURE 1, the lower or exposed sur-

face of the mounting strip 28 preferably is provided along one marginal edge with a suitable scale 29 in inches and fractions thereof inscribed thereon in any desired manner. The blank strip 21 shown in FIGURE 1 is divided longitudinally into portions six inches in length by transverse lines of severance 31 preferably cut entirely through the members 22—27 and through all but the exposed marginal portions of the mounting strip 28, so as to render the blank 21 readily separable into portions six inches long. The scale 29 facilitates cutting these portions into separate tabs of selected length. As also best seen in FIGURE 1, the mounting strip 28 is perforated along parallel longitudinal lines 32, 33, 34, and 35. Intermediate adjacent ones of said lines of perforation, the mounting strip 28 is perforated in longer increments on longitudinal lines 36, 37 and 38. In the modification herein illustrated in FIGURES 1–5, lines 32 and 33 are each spaced ¼ of an inch from the line 36, the lines 33 and 34 are each spaced ½ of an inch from the line 37, and the lines 34 and 35 are spaced, respectively, ⅛ of an inch from the line 38. With such an arrangement, the mounting strip 28 may readily be severed along the lines 32, 33 to provide an index tab insert foldable on the line 36 to comprise a double walled insert ¼ of an inch in vertical height, as seen in FIGURE 5. Likewise, severing of the mounting strip along the lines 33 and 34 and folding such severed portion along the line 37 will provide a two walled tab insert ½ inch in height. An insert ⅛ inch in height similarly may be provided by severing the mounting strip 28 along the lines 34 and 35 and folding such severed portion along the line 38.

It will be appreciated that the rear surface (upper surface in FIGURE 1) of the mounting strip 28 preferably will have typed or otherwise suitably inscribed thereon in the proper portion thereof such indicia as it is desired to expose in the final position of use. Such markings or inscriptions may easily be made on the mounting strip 28 before separation thereof from the marginal strips 27 or transverse severance of the blank strip 21. It also will be understood that if the portion of the mounting strip 28 selected for use as the tab insert is folded along the associated line 36, 37 or 38, indicia applied to the two portions thereof divided from each other by said lines must be inverted wtih respect to each other, in order for the same to be read properly from opposite sides of the index tab when in use. This will best be understood with reference to FIGURE 5 wherein reference numeral 39 designates such indicia inscribed on one exposed face of the tab insert, and it will be appreciated that the same indicia should be so inscribed on the reverse or other exposed surface of the insert as to be readable from the other side of the tab. Of course, when desired, indicia may be printed on the rear or lower surface of the mounting strip 28. The construction illustrated in FIGURES 1–5, however, is that provided for custom indexing, including the application of desired indicia and forming of index tabs of any selected length.

In connection with the above-described arrangement enabling use of the mounting strip 28 for the index tab insert, the upper surface (as seen in FIGURES 2 and 3) of the cellulose strip portion 24 preferably has three colored lines 41, 42 and 43 inscribed thereon in longitudinally extending parallel relationship, with the outermost line 41 adjacent the inner edge of the associated marginal strip 27 and the spacing of the lines 42 and 43 therefrom being ⅛ of an inch and ¼ of an inch, respectively. Since the cellulose strip 24 is transparent, these guide lines 41–43 may be inscribed on either side thereof. Also, if desired, those lines may be inscribed on the under or inner side of the backing strip 22, this arrangement being illustrated in its accomplishment in FIGURE 11.

In using the blank strip 21, the user may sever the end portion thereof by tearing the perforated end extensions of the first line of severance 31, and that end portion then may have the desired indicia inscribed on a selected part of the mounting strip 28, either in script or by use of a typewriter. If it is desired to have the index tab insert ½ inch wide, the central portions between the lines of perforation 33 and 34 will be used. The thus inscribed portion of the blank strip 21 then is cut off to the proper length, and that part of the mounting strip 28 on which the indicia are inscribed is separated along its marginal lines of perforation 33, 34 and folded along its central line 37 to form an indicia bearing member or insert which is designated in FIGURES 4 and 5 by reference numeral 44.

At the same time or after such removal of the insert 44, the remainder of the mounting strip 28 on the severed portion is removed and the resulting index tab, indicated generally in FIGURES 4 and 5 by reference numeral 45, is placed on a supporting surface with the adhesive marginal strips 27 facing upwardly. The sheet 46 to which the index tab is to be attached then is pressed onto the adhesive strip 27 on the cellulose strip 24, with the upper edge of the sheet extending along the outer guide line 41. The insert 44 then may be positioned by pressing its central fold into contact with the central exposed portion 26 of the adhesive inner surface of the backing strip 22, in the manner illustrated in FIGURE 4. The tab 45 then is folded over to present the filler strips 24, 25 in face-to-face relationship and the other adhesive strip 27 pressed against the upper surface of the sheet 46 to complete the mounting of the tab thereon. As shown in FIGURE 5, the insert 44, although thus retained by the adhesive on the central hinge portion 26, may readily be removed from the tab 45 and another insert substituted therefor. FIGURE 5 also illustrates the fact that the tab 45 may be mounted in the manner above described on the sheet 46 and the insert 44 thereafter slid into position between the two opposed cellulose strips 24, 25. It will be appreciated that the spacing of the strips 24, 25 from each other to provide the exposed portion 26 is such as to be substantially equal to the double thickness of the insert 44 plus the thicknesses of the two adhesive strips 27. As a result, that hinge portion 26 eliminates any bulkiness and permits the tab 45 to be attached smoothly to the sheet 46 as illustrated in FIGURE 5. Also, it will be appreciated that the insert 44 may be torn apart along tis center line of perforations, which means that the desired indicia 39 may be typed on the mounting strip 28 without requiring reversal of the blank strip 21 in the typewriter. The optional use of the guide lines 42 or 43, instead of line 41 as illustrated in FIGURE 4, will result in an insert-receiving space within the tab 45 ⅜ or ¼ of an inch, respectively, in height. When either of those heights are selected, it will be understood that the desired indicia 39 should be inscribed on the mounting strip 28 between the lines of perforation 32 and 33 or 34 and 35, respectively. Regardless of the active height of the tab above the adjacent edge of the sheet 46 to which it is attached, the skirt portions thereof, which are those lower parts that are attached to the sheet 46, will never interfere with any printed material, or the like, that may appear on the sheet 46 because of their being transparent.

This modification of FIGURES 1–5 thus comprises a blank strip from which index tabs of desired length may be cut as needed, and which includes a mounting strip, for maintaining the tab in useable condition until it is to be applied to a selected sheet, which also may be used as an indicia-receiving insert. Since no moistening is required to mount the tab because of its pressure-sensitive adhesive coated and transparent skirt or wing portions, it thus will be seen that a pen, pencil or typewriter is the only equipment needed, other than a pair of scissors if the selected length is less than the distance between the transverse lines 31, in order to prepare and amount this novel index tab.

The modification of FIGURES 6 and 7 is intended for specific use as a file folder tab protector which also may be employed to mount an indicia-bearing insert. Like the modification of FIGURES 1–5, the blank strip desig-

nated in FIGURE 6 generally by reference numeral 47 comprises a four-ply structure. The first or uppermost ply in this figure is a base member or strip 48 of polyester film, such as "Mylar," which is substantially identical to the previously described strip 22 and, similarly, has its entire lower surface covered with a suitable transparent and pressure-sensitive adhesive. The second ply comprises a narrow colored strip 49, and the third ply comprises parallel filler members or strip portions 51 and 52, spaced from each other at 53, which are similar to the previously described strips 24 and 25 except that they are narrower than the backing strip 48, so that marginal portions of the latter are exposed to provide adhesive covered skirt or wing sections which function in the same manner as the adhesive strips 27 previously described. The fourth ply of this blank strip 47 is a mounting strip 54 similar to the mounting strip 28, being made of a suitable polyethylene-impregnated paper, except that it is perforated longitudinally on three parallel lines 55. The middle one of these lines of perforation 55 extends along the center of this mounting strip 54 and the other two such lines are spaced therefrom slightly less than the width of the wider cellulose strip 52. Thus, indicia 39 may be inscribed on the rear surface of the mounting strip 54 between these lines of perforation 55 and, after the strip 47 has been severed transversely, tearing of the mounting strip along the lines of perforation 55 will provide an indicia bearing member or insert 56, as illustrated in FIGURE 7. The severed portion of the blank strip 47 when removed from the mounting strip 54 comprises a file folder tab protector 57. This should be applied to a file folder 58 (FIGURE 7) by placing the tab on a supporting surface with its adhesive coated skirt or wing portions uppermost and placing the file folder on the skirt portion adjacent the narrowest strip 51, using the colored strip 49 as a guide extending along the upper edge of the tab 59 of the file folder. The insert 56 then may be placed over the tab 59 and the protector 57 folded along the spacing or hinge portion 53 into its position of FIGURE 7. Or, if desired, the protector 57 may first be so folded and attached and the insert 56 subsequently slid into the pocket defined by the cellulose strip 52 and the file tab 59.

As will be appreciated from the illustration in FIGURE 7, when the tab 57 is so mounted on the sheet or file folder 58, the strip 49 provides a color indication visible from both sides of the tab. The width of the filler strip 52 is approximately equal to the height of the file folder tab 59. Since this filler strip 52 is transparent, it will be understood that the tab 57 may be employed solely as a file folder tab protector without using the insert 56. It also will be understood that this modification of FIGURES 6 and 7 may be made with the filler strips 52 of the same width and the spacing 53 slightly increased, so that an insert 56 may be mounted on each side of the tab 59 between it and the strips 51 and 52, respectively. And it also will be appreciated that the modification of FIGURES 1–5 likewise may be employed as a file folder tab protector.

The modification illustrated in FIGURE 8 also comprises a four-ply blank strip, which is designated generally by reference numeral 61, but is so formed as to constitute a plurality of identical colored placement tabs, indicated generally by reference numeral 62, that are readily separable therefrom and adapted to be mounted on a sheet 63 in the manner shown in FIGURE 9. As in the preceding modifications, the uppermost ply of the strip 61 comprises a base member or backing strip 64 of a suitable polyester film, such as "Mylar," the under surface of which is coated throughout with a transparent and pressure-sensitive adhesive. Secured thereto is the second ply which comprises a colored strip 65 of any suitable material that has its lower surface coated with an adhesive. The third ply comprises a pair of filler members or strips 66 of any suitable material that are parallel to each other and spaced from each other at 65 to provide the same hinge construction previously described with respect to the other modifications. The fourth ply of the strip 61 comprises a mounting strip of the same material as the strips 28 and 54 but which is severed longitudinally along a line 69, preferably somewhat off center. It is also perforated along longitudinal lines 71 that are spaced transversely a short distance outwardly from the marginal edges of the backing strip 64. This blank strip 61 also is completely severed parallel transverse lines 72 which extend laterally beyond the lines of perforation 71 and define the separate placement tabs 62. With this construction, it will be appreciated that one or more of the tabs 62 readily may be removed, either with or without the associated portion of the mounting strip 68, and after the latter has been peeled therefrom, the tab may be folded along its hinged portion 67 and secured to a sheet 63 in the manner illustrated in FIGURE 9.

The modification shown in FIGURE 10 also comprises a four-ply blank strip which is designated generally by the reference numeral 73. As in the other modifications, the uppermost ply in the strip 73 comprises a base member or backing strip 74 substantially identical to the previously described strips 22, 48 and 64 which, likewise, has its lower surface covered with a suitable pressure-sensitive and transparent adhesive. As in the modification of FIGURES 6 and 7, this blank strip 73 employs a narrow colored strip 75 as its second ply, but the latter is secured to the backing strip 74 along its longitudinal center line. The third ply of the strip 73 comprises a pair of filler members of cellulose strips 76 parallel to and spaced from each other to provide a hinge spacing 77 under the colored strip 75. Either on the upper surfaces of these strips 76 or on the backing strip 74 are printed or otherwise inscribed a series of indicia, shown in FIGURE 10 as comprising the letters of the alphabet 78. These are disposed in regularly spaced relationship longitudinally of the strip and in tumbled relationship relative to the center line thereof so that, when subsequently mounted for use, the indicia may be read properly from opposite sides of the resulting tab. Consequently, it will be appreciated that the filler strips 76 should be opaque so that the opposed indices 78 will not visually interfere with each other. As in the modifications of FIGURES 6–9, the backing strip 74 extends laterally of the strip 73 well beyond the outer margins of the parallel strips 76 to provide adhesive-coated skirt portions. It is these skirt portions which are adhered to the fourth ply of the blank strip 73 which comprises a mounting strip 79 similar to the previously described mounting strips but having no perforations therein.

At equally spaced distances longitudinally of the strip 73, lines of severance 81 through the members 74, 75 and 76 are provided which are parallel to each other and define the longitudinal edges of a series of pre-printed standard index tabs. Both to facilitate removal of these tabs from the mounting strip 79 for desired placement in similar fashion to the tab 62 shown in FIGURE 9 and to provide an index tab having its outer corners chamfered, the members 74, 75 and 76 have diamond-shaped portions removed therefrom to provide apertures 82 disposed centrally of each transverse line of severance 81. When mounted on the edge portion of a sheet of paper, or the like, each tab not only provides an index indication readily readable from each side of the sheet, but the strip 75 provides a color indication also visible from each side of the sheet.

The novel method of this invention for making the composite strips hereinbefore described comprises the steps of presenting a pair of parallel filler strips, which are in laterally spaced relationship relative to each other, to an intermediate strip and superposing thereon at a predetermined lineal speed a backing strip having its lower surface coated with pressure-sensitive adhesive, feeding a strip of release paper at such predetermined lineal speed and superposing the backing, filler and inter-

mediate strips thereon, and severing the latter strips transversely for a distance less than the width of the release paper on lines spaced from each other a predetermined distance longitudinally of the strips. This provides a composite strip which is readily marketable in flat, folded or rolled form from which tabs may easily be removed from the release paper and accurately applied to a selected sheet as strong, smooth and flexible tabs of minimum thickness. One of the most important steps in this method is that of maintaining the filler strips parallel and in properly spaced relationship, since the resulting hinge portion thus formed must be very accurately located in order to prevent bulging and misalignment of opposite edges when the tab is mounted in its position of use. This method of making the novel composite strip has the further advantage of enabling desired printing to be accomplished on selected portions of the strip, such as on either or both sides of the backing, filler or release paper strips, and in any desired form, including the scale **29**, directions on visually exposed portions of the obverse side of the mounting strip, the guide lines **41–43**, or the indices **78**. The method of making the composite strip of this invention also includes punching of such apertures as those designated by reference numeral **82** before the punched portion of the strip is presented to the mounting strip, which simplifies removal of those portions punched out to form the apertures.

In FIGURES 11, 12 and 13 one form of novel apparatus for carrying out the method of this invention is disclosed which may be used to make the different forms of composite strips contemplated. This apparatus is mounted upon and supported by a frame of any suitable construction which is designated generally by reference numeral **83**. Mounted in well known manner on a lower shelf portion of the frame **83** is a source of operating power in the form of an electric motor **84** which drives a fly wheel **85** through the agency of a belt **86**. The fly wheel **85** is secured to a drive shaft rotatably supported in any well known manner by the machine frame **83** and having a sprocket wheel **87** attached thereto. This wheel **87** drives a chain **88** which drives one portion of a double sprocket wheel **89** secured to a main drive shaft **91** suitably journalled in upstanding portions of the frame **83**.

The main drive shaft **91** also has a feed roller **92** mounted thereon for rotation therewith which comprises part of the drive means for moving the various strips longitudinally at a predetermined speed of travel. Cooperating with this feed roller **92** is a pressure roller **93** mounted on a horizontal shaft above the roller **92** in any suitable manner.

Mounted freely on a transverse shaft **94** is a roll of the polyester film strip **22** which is drawn over a guide pulley or flanged roller **95** by the driving action of the rolls **92, 93**. As shown in FIGURE 11, the guide lines **41–43** of the strip construction illustrated in FIGURES 1–5 may be inscribed upon a surface of the backing strip **22** by means of a plurality of inking members **96**, preferably in the form of ball point pens, which are mounted in a suitable bracket and spring-urged into inscribing engagement with the strip **22** as it passes over the guide pulley **95**. It will be understood that this pulley **95** is freely rotatably mounted in any suitable manner.

A roll of the cellulose, acetate base or other desired material forming the strip **23** is freely rotatably mounted adjacent the upper portion of the frame **83** by a shaft **97** carried in any suitable manner by the latter. The strip **23** is withdrawn from this roll under a guide pulley **98** similar to and mounted in the same manner as the guide pulley **95**. From the guide pulley or flanged roller **98** the strip **23** passes over a cylindrical platen **99** which is also freely rotatably mounted in any suitable manner on the frame **82**. A knife blade **101** extending longitudinally of the strip **23** is mounted by means of an adjustable bracket **102** above the platen **99** so as to sever the strip **23** longitudinally, as the same is drawn over the platen, into the previously described filler strips **24** and **25**. These strips **24, 25** are then carried under a guide and spacing means in the form of a thin wheel **103** which is freely rotatably mounted on the frame **83** in any suitable manner, the strips **24, 25** being moved thereunder at the same predetermined lineal speed as the backing strip **22** by the feed and pressure rolls **92, 93**. As best illustrated in FIGURE 13, it will be seen that the thin wheel **103** tapers inwardly from a centrally located perpiheral edge to its base thickness which is equal to the spacing **26** desired to be maintained between the strips **24** and **25**. It is preferred that this wheel **103** be formed integrally with, or as a part of, a shaft **104** comprising a part of the guide and spacing means. The wheel **103** then should extend radially beyond the shaft **104** substantially only for the thickness of the strip **23**. With this arrangement, the wheel **103** will insure proper separation of the strips **24, 25** without interfering with any other strip or strips that likewise may be carried under the freely rotatable shaft **104** for integration with the strips **22, 24** and **25** by the rollers **92, 93**.

In this connection, one or more rolls of strips for the intermediate strips previously described are adapted to be freely rotatably mounted on a shaft **105** carried by the frame **83**. In FIGURE 11, the arrangement of the various rolls of strips illustrated is that employed in making the composite strip of FIGURES 1–3. Therefore, the rolls so mounted on the shaft **105** comprise two rolls of the adhesive-coated, laterally marginal, intermediate strips **27** spaced from each other (as shown in FIGURE 3) laterally by any suitable guide collars mounted on the shaft **105**. These strips **27** are drawn over a suitable guide roll **106**, which is freely rotatably mounted on the frame **83**, by the feed and pressure rolls **92, 93** for incorporation into the composite strip. A roll of release paper comprising the mounting strip **28** is freely rotatably mounted on a shaft **107** carried in any suitable manner by the lower portion of the frame **83**. This strip **28** is carried upwardly over a pressure roller **108** and under an idler roller **109**, both of which are mounted for free rotation on the frame **83** in any suitable manner. From there the strip **28** passes over a flanged roller **111** rotatably mounted on a shaft **112** carried by the frame **83** which, as will be explained hereafter, may be positionally interchanged with the pressure roller **108**. From the flanged guide roller **111**, the strip **28** passes under idler rolls **113** and **114** and under and around a cylindrical cutter platen **115**, all of which are freely rotatably mounted in suitable manner on the frame **83**. Cooperating with this platen **115** are one or more serrated perforating cutter wheels **116** which are freely rotatably mounted on a transverse shaft **117** and spaced thereon by suitable spacing collars to perforate the strip **28** longitudinally on the lines **32–38**, or **55** (FIGURE 6) or **71** (FIGURE 8). A similar but solid cutter wheel likewise may be mounted on this shaft **117** for severing the mounting strip **68** along the longitudinal line **69** when making the modification illustrated in FIG. 8. As in the case of the other component strips, the strip **28** is drawn along its guided path of travel from its roll by the driving means comprising the feed roller **92** and the pressure roller **93**. These latter rolls also function to adhesively secure the several component strips together to form the same into a composite strip.

As previously explained, the invention contemplates transversely severing such composite strip, preferably for a distance less than the full width of the mounting strip, on transverse lines that are spaced from each other longitudinally of the strip at predetermined intervals. One form of apparatus for accomplishing such transverse cutting is that illustrated in FIGURES 11 and 12, which comprises a cylindrical platen **118** and a slitter rotatably cooperating therewith and indicated generally by reference numeral **119**. As seen in FIGURE 11, the cylindrical platen **118** is mounted upon, and secured in any

suitable manner to, a transverse shaft **121** journalled in the machine frame **83**. Also mounted upon, and secured against rotation relative to, the shaft **121** is a double sprocket wheel **122**, one portion of which engages and is driven by a chain **123** meshing with one portion of the double sprocket wheel **89**.

The slitter **119** similarly is secured against rotation relative to, and mounted upon, a transverse shaft **124** journalled in the machine frame above the shaft **121**. It is preferred that any well known manner of so rotatably mounting the shaft **124** be employed which may facilitate fine vertical adjustments thereof relative to the platen **118**. Suitable gearing is interposed between the shafts **121** and **124**, so that rotation of the former and the platen **118** from the main drive shaft **91** through the agency of the chain **123** will be imparted to the slitter **119**. As best seen in FIGURE 12, this slitter **119** comprises a cylindrical body having a plurality of transversely extending and radially disposed guide slots **125** defined by parallel wall portions **126** and spaced from each other circumferentially of the cylindrical roller. Each or any selected one or more of these slots **125** is adapted to slidably receive a knife blade **127** which may be retained in operative position therein in any suitable manner, as by means of set screws **128** extending through suitable tapped apertures in one of the associated side walls **126**.

Suitable supplementary feed mechanism and discharge conveying means are provided which, as shown in FIGURE 11, may comprise a belt conveyor **129** and a pressure roller **130** cooperating therewith. A drive roller **131** for mounting the receiving end of the belt conveyor **129** is rotatably mounted in any suitable manner and has a double sprocket wheel **132** rigidly secured thereto which is driven by a chain **133** engaging one portion of the previously described double sprocket wheel **122**. At its discharge end, the belt conveyor **129** is supported by an idler roller **134** rotatably mounted in any suitable manner, and the lower run of the belt is drivingly engaged by a take-up roller **135** which is driven from the double sprocket wheel **132** through the agency of a chain **136**. Arms **137** at each side of the machine pivotally support the pressure roller **130** so that the weight of the latter insures driving contact of the composite and transversely slit strip with the belt conveyor **129**.

It thus will be seen that the composite strip may have only certain component strips thereof transversely slit with such an arrangement, as on the lines **81** of the modification of FIG. 10, or it may be transversely cut completely through, but for a distance less than the full width of the mounting strip, as illustrated at **31** in FIGURE 1 and **72** in FIGURE 8. The lateral extent of the resulting slits will be determined by the effective length of the knife blade or blades **127**. At the same time, the knife blade may be serrated radially of the slitter **119** adjacent its ends to accomplish the perforations in the composite strip illustrated at the ends of the lines of severance **31** in FIGURE 1. The guide slots **125** are spaced circumferentially to effect transverse slitting at minimum increments (as illustrated in FIGURE 8) when a knife blade **127** is mounted in each of them. In the embodiment herein shown, the circumference of the slitter **119** is substantially 12 inches, so that two diametrically opposed blades **127** are employed, as illustrated in FIGURE 12, for effecting transverse slitting of the composite strip on lines **31** (FIGURE 1) which are spaced 6 inches from each other. It will be readily understood that any desired intermediate spacing of the transversely extending slits may be effected by proper selection and positioning of knives **127** in the appropriate slots **125** of the slitter **119**.

To effect any desired printing on the composite strip, in addition to the inscribing of the guide lines by the pens **96**, a printing wheel or type carrying roller **138** may be employed in conjunction with the pressure roller **108** previously described. To this end, the wheel **138** is shown as removably secured to a transverse shaft **139** which is provided with a driving sprocket wheel **141** that is rotated by a chain **142** driven by a sprocket wheel **143** secured to the shaft **124**. A splined shaft **144** similar to the shaft **139** is rotatably mounted in the machine frame and carries a sprocket wheel **145** which also is engaged and driven by the chain **142**. The illustration in FIGURE 11 shows these parts mounted in such manner as to imprint desired indicia on selected portions of the upper or obverse surface of the mounting strip **28** which will be visually exposed after completion of the composite strip. If it is desired to imprint indicia on the lower or reverse side of the mounting strip, such as the scale **29** of FIGURE 1, it is only necessary to rearrange the printing mechanism just described as follows. The printing wheel **138** is slidably removed from its shaft **139** and place on the splined end portion of the auxiliary shaft **144**, and the pressure roller **108** and the flanged guide roller **111** are then interchanged positionally. The strip **28** then is threaded around the repositioned guide roller **111** under the idler roller **109** (as shown in FIGURE 11) and between the repositioned pressure roller **108** and printing wheel **138**, the center line distance between the shafts **112** and **144** being the same as that between the shaft on which the pressure roller **108** is shown mounted in FIGURE 11 and the shaft **139**. The under or reverse side of the strip **28** then will be in contact with the printing wheel **138**.

The apparatus illustrated in FIGURE 14 comprises a modified form of mechanism intended to be substituted in the machine of FIGURE 11 for the slitter **119** and its immediately associated parts. To this end, the same as illustrated as being employed to make the composite strip shown in FIGURE 10. The backing strip **74** is brought between the feed roller **92** and pressure roller **93** in the same manner as the backing strip **22** shown in FIGURE 11. The narrow colored strip **75** and the filler strips **76** are drawn between the rollers **92, 93** in the manner illustrated in FIGURE 14. It will be appreciated that this may require slight repositioning or modification of the arrangement of the slitting mechanism **99–102** of FIGURE 11. The mounting strip **79** in the device of FIGURE 14 is not presented to the rollers **92, 93**. Instead, a similar pair of feed and pressure rollers **146** and **147** are mounted in any suitable way in spaced relationship to the rolls **92, 93** and driven in similar manner to the latter.

Interposed between these two sets of rollers is a punching means comprising a vertically reciprocable punch **148** normally held in an elevated and inoperative position by a spring **149** against a cam **151** secured to a transverse shaft **152** that is rotatably mounted in any suitable manner in the machine frame. Drivingly secured to this shaft **152** is a pulley wheel **153** adapted to be driven by a belt **154** either from the pulley wheel **153** adapted to be driven by a belt **154** either from the pulley wheel **85**, a modification thereof, or in any other suitable manner. The lower end of the punch **148**, when depressed against the action of the spring **149** by the cam **151**, cooperates with a die platen **155** to punch an aperture of selected configuration through the several strips **74–76** as the same are drawn over this die platen **155** by the feed and pressure rollers **146, 157**. Secured to the under side of the die platen **155** is a suction exhaust pipe **156** which functions in well known manner to insure disposal of the blanks or aperture-defining central portions cut from the strips **74–76** by this punching means.

After such apertures, which are similar to those shown at **82** in FIG. 10, are so punched, the strips **74–76** are adhered to the mounting strip **79** by the feed and pressure rollers **146, 147**, and the resulting composite strip is continued through the machine by such feed means as the pressure roller **130** and belt conveyor **129** previously described. Such movement of the composite strip carries it across an anvil **157** suitably mounted on the frame of the machine for vertical adjustment. Also mounted

on the machine frame and above this anvil **157** is a transversely disposed slitter knife **158** carried on the bottom end of a solenoid plunger **159** that normally is held in a raised inoperative position by a spring **161**. The solenoid **162** when energized causes a sharp downward movement of the plunger **159** against the action of the spring **161** a predetermined distance, as limited by the head of the plunger. The anvil **157** thus may be adjusted to enable the knife **158** to slit through the strips **74–76** only, if desired, without cutting the mounting strip **79**. In order to actuate this slitter means in timed relationship to the operation of the punching means, a second cam **163** is mounted on the shaft **152** of the punching means which instantaneously closes a normally open switch **164** connected in the supply line **165** to the solenoid **162**. This results in instantaneous energization and substantially immediate de-energization of the solenoid in timed relationship to the operation of the punch **148**.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction, and arrangement of the parts of the article and apparatus and in the steps in the method without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the steps and forms hereinbefore described being merely preferred embodiments thereof.

I claim:

1. The method of making a composite strip continuously, comprising presenting a pair of parallel filler strips in laterally spaced relationship relative to each other to an intermediate strip and superposing thereon at predetermined lineal speed a backing strip having its lower surface coated with pressure-sensitive adhesive, feeding a strip of release paper at said predetermined lineal speed and superposing said backing, filler and intermediate strips thereon, and severing said latter strips transversely for a distance less than the width of said release paper on transverse lines spaced from each other longitudinally of said strips a predetermined distance.

2. The method of claim 1, wherein said pair of filler strips are formed by cutting a single strip longitudinally and laterally separating the cut edge portions.

3. The method of claim 2, wherein said composite strip comprises marginal skirt portions on each side separably attached to said release paper, inscribing longitudinally extending and laterally spaced guide lines on said composite strip adjacent an inner edge of one of said skirt portions to assist in subsequently selectively attaching tab portions of said composite strip to edge portions of receiving sheets.

4. In the method of claim 1, punching apertures through said backing, filler and intermediate strips centrally of said transverse lines to remove aperture-defining central portions therefrom prior to superposing said strips on said strip of release paper.

5. A device for making a composite strip for subsequent use as separable index tabs, comprising means for rotatably supporting a plurality of rolls of strip material, with the strip on at least a first one of said rolls having a surface coated with a pressure-sensitive adhesive and that on a second one of said rolls being release paper releasably adherable to such adhesive, means for severing a third strip longitudinally and spacing the resulting separate portions laterally to provide parallel filler strips, and means for removing said strips from said rolls and adhesively securing the same together, with said filler strips intermediate the strips from said first and second rolls.

6. A device for making a composite strip for subsequent use as separable index tabs, comprising means for freely rotatably supporting a plurality of rolls of strips, including a first strip having a surface coated with a transparent and pressure-sensitive adhesive, a second strip of release paper releasably adherable to such adhesive, and a pair of laterally separated parallel filler strips, drive means for removing said strips from said rolls, guide means for insuring parallel alignment of said strips and attaching the same in superposed relation to each other to form a composite strip with said release paper as a mounting strip for said other strips and extending laterally therebeyond, and severing means for transversely cutting through said other strips at predetermined points spaced longitudinally of the composite strip without severing marginal portions of said mounting strip.

7. A device according to claim 6, wherein said severing means comprises a cylindrical roller having a plurality of transversely extending and radially disposed guide slots spaced from each circumferentially thereof, and cutter blades selectively positionable in said slots.

8. In a device according to claim 6, means for punching apertures through said other strips at said longitudinally spaced predetermined points before attachment thereof to said mounting strip.

9. A device according to claim 8, wherein said severing means comprises an electrically reciprocable knife disposed in predetermined spaced relationship longitudinally of said composite strip relative to said punching means, and switch means operable by said punching means for controlling operation of said severing means.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,070,482 December 25, 1962

Walter F. Cunningham

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 44, for "tis" read -- its --; line 70, for "amount" read -- mount --; column 6, line 9, after "severed" insert -- along --; line 30, for "of", second occurrence, read -- or --; column 10, line 16, for "place" read -- placed --.

Signed and sealed this 27th day of August 1963.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents