

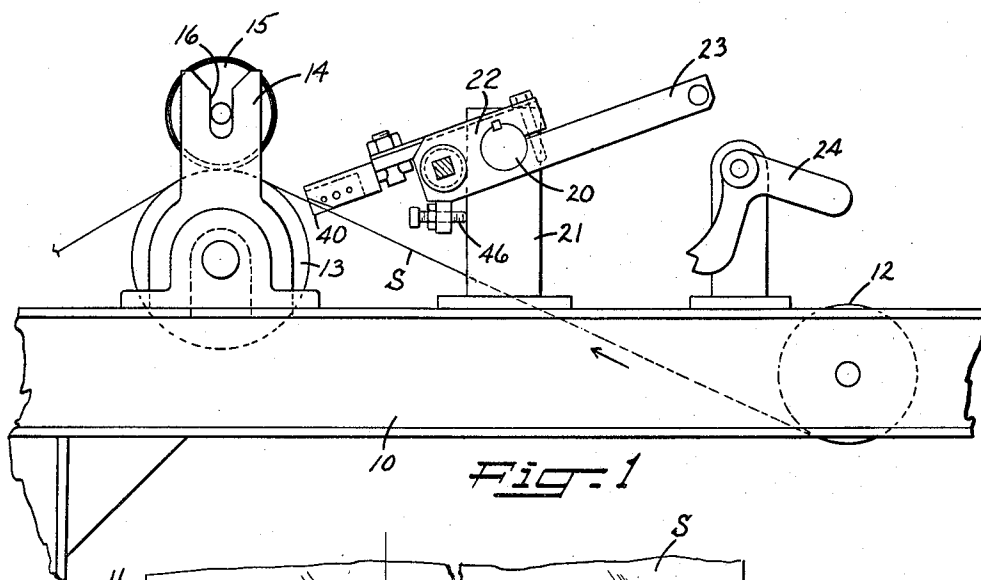
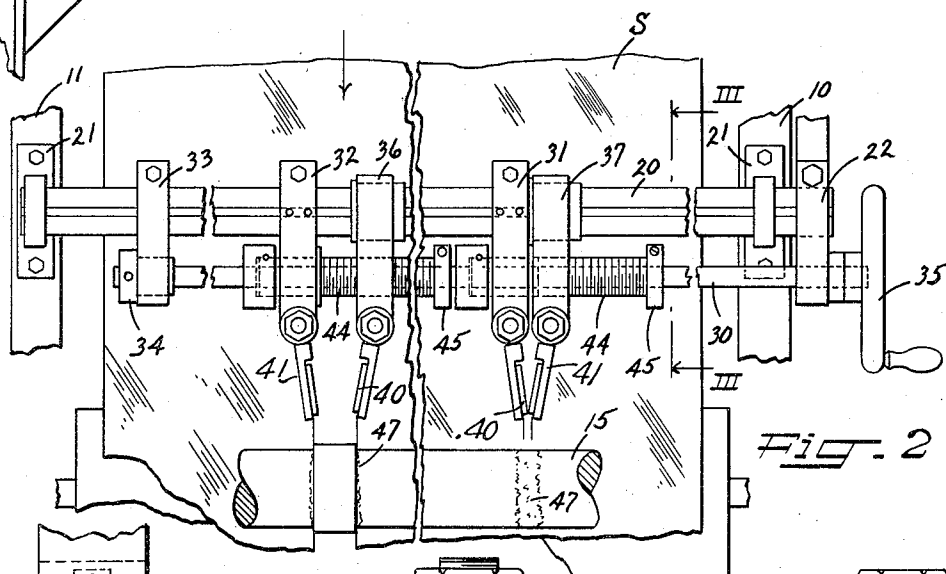
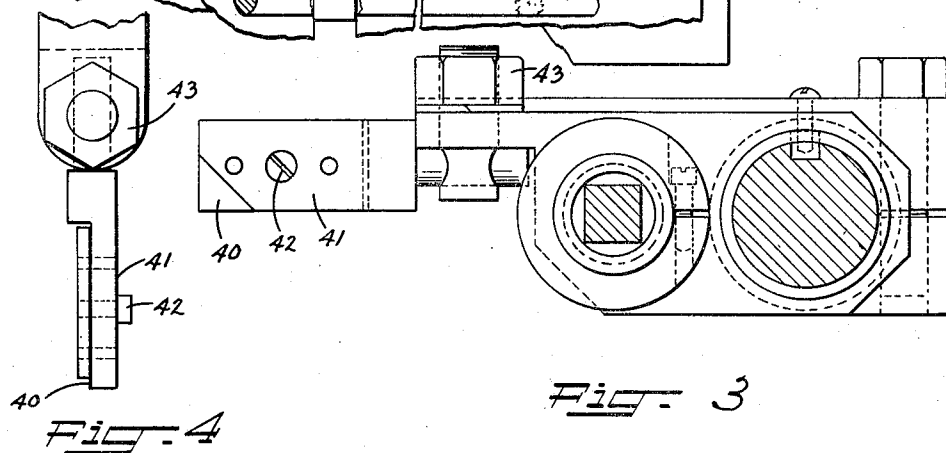
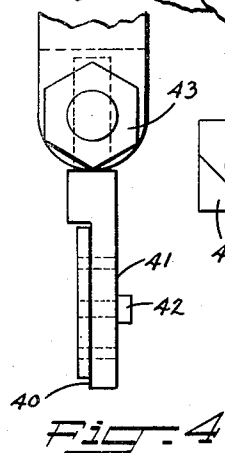
June 3, 1958

L. B. CUNDIFF ET AL
SHEET-SAMPLING MECHANISM

2,837,155

Filed April 28, 1955

2 Sheets-Sheet 1



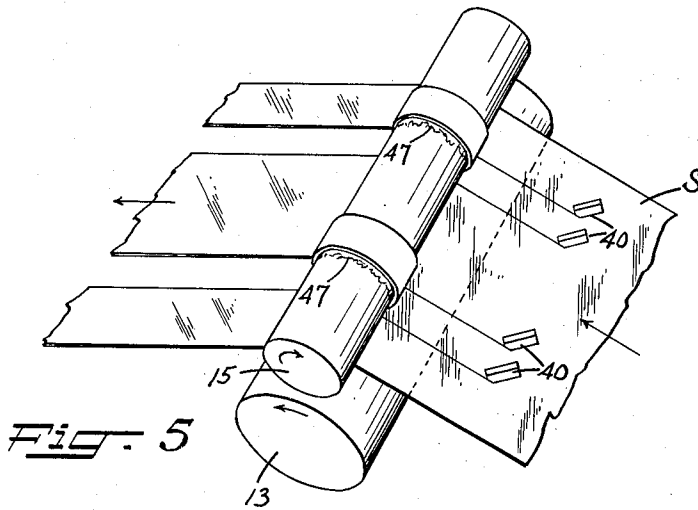
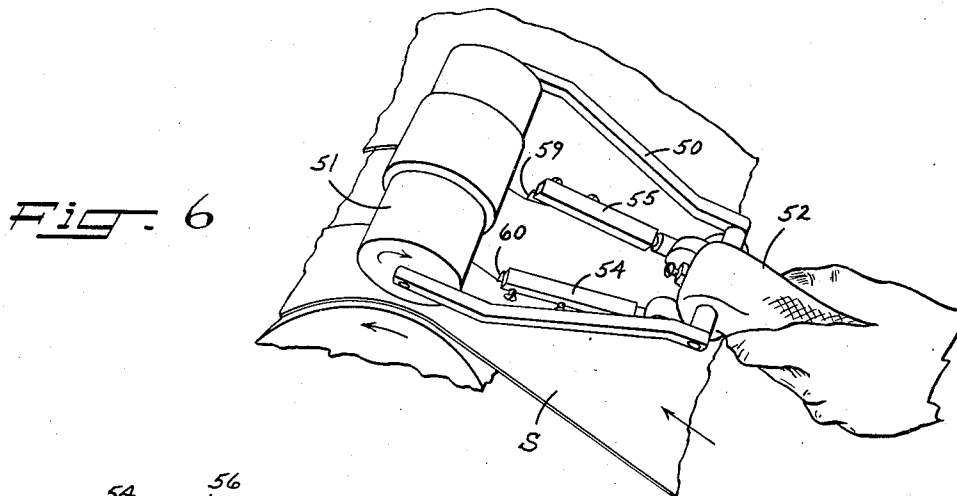
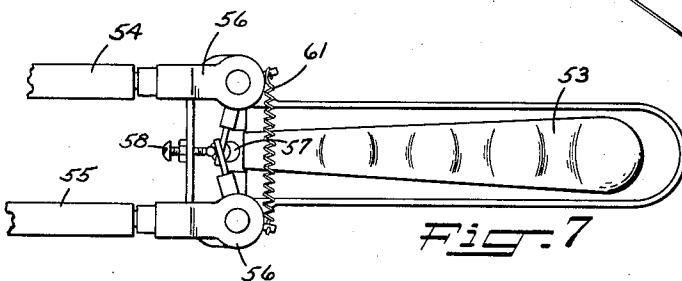
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2 Sheets-Sheet 2



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SHEET-SAMPLING MECHANISM

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8 Claims. (Cl. 164—36)

This invention relates to mechanism for obtaining a sample from a running web of sheet material and, more particularly, to a device for removing a narrow strip from a running plastic sheet material such as cellophane which strip may be used for testing and analysis purposes.

For the purpose of obtaining samples of a running web of sheet material such as cellophane or other synthetic plastic, it has been necessary to stop the machine or to cut the sample from one of the edges of the sheet. This was done either with a knife or with a tool of the type disclosed in Vollrath U. S. Patents 2,333,964 and 2,374,847. The obvious disadvantage of such a procedure is that the sheet is weakened seriously and it is difficult to obtain the sample without completely rupturing the sheet. Also, it is extremely difficult, if not impossible, to obtain a sample near the center of the running sheet using the prior art technique and apparatus.

The present invention has for its primary object the provision of a sampling tool which can be positioned at any point across the width of the running web and which extracts a strip of sheet material leaving clean forward and trailing slot termini in the running sheet.

A further object of the invention is to provide a sample-obtaining tool for a running web of sheet material comprising a pair of blades which move relative to one another and a take-up roller positioned adjacent the blades.

A further object of the invention is to provide an improved method for obtaining a sample from a running web of sheet material.

A still further object of the invention is to provide a manual tool having a pair of laterally movable blades and a supported take-up roller.

A still further object of the invention is to provide an attachment for a web-handling machine such as a drier for obtaining samples of the web at predetermined laterally spaced positions across the web width.

Further objects and advantages will be apparent from a study of the specification and drawings in which:

Figure 1 is a side view of a portion of a cellophane drier having attached thereto the sampling device of the present invention;

Figure 2 is a top view of the structure of Figure 1 (with certain parts broken away and the manual adjusting wheel added) showing one sampling assembly in full cutting position and another sampling assembly in the initial slitting position;

Figure 3 is an enlarged sectional detail as seen at III—III of Figure 2;

Figure 4 is a fragmentary top view of the blade holder of Figure 3;

Figure 5 is a perspective showing the operation of the take-up roller for the web sample;

Figure 6 is a perspective showing a modified form of the invention;

Figure 7 is a bottom view of the handle and blade actuating structure of the sampler of Figure 6;

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Figure 8 is a top view on a reduced scale of the flattened sample obtained with the manual device of Figure 6; and

Figure 9 is a top view of the flattened sample as obtained with the device of Figures 1—4.

The invention comprises essentially the provision of a pair of cooperating cutting blades which are held either manually or supported on a web-handling machine in such a way that the blades may be moved laterally toward and away from each other. A take-up roll having an adhesive coating is positioned adjacent the point at which the blades cut two parallel slits in the web so that the sample, as defined by the slits, is picked up and collected on the roll. In effect, the movement of the blades with respect to each other is manually controlled in both the embodiments illustrated herewith. In the one case, manual actuation and control of the blades is achieved by pressure, as exerted by an operator, upon a pair of connected pivoted handles having the form of certain types of scissors or grass clippers. In the other form, the operator turns a crank on a threaded shaft to control and actuate the blade movement.

The method includes the steps of initially positioning the blades so that they are closely spaced together with a clearance therebetween of approximately one-sixteenth of an inch. The blades are then inserted into the running sheet to form two very closely spaced slits in the running web. Manual actuation of the handle or crank moves the blades away from each other to the desired width of the sample. The blades are retained in the spaced relation until the desired length of the sample has been cut whereupon the blades are then moved together to taper off the trailing edge of the sample so that it automatically tears out when this narrow tapered end reaches a sample take-up roller. The take-up roller is positioned just downstream of the blades and may have an adhesive surface to assist in picking up the sample. Depending upon circumstances, it may be necessary to manually break off the leading edge of the sample. If the leading edge is sufficiently thin, the adhesive on the roll will naturally pick it up. Under other circumstances, it has been found desirable to use a slightly wider initial spacing for the blades in which event the operator merely reaches over and punches over the leading edge of the sample whereupon it is then automatically picked up by the roller.

Referring now to the drawings, the upper frame of a cellophane drier is shown fragmentarily at 10 and 11 (Figures 1 and 2). The rolls 12 and 13 are journaled in the framework and control the travel of the cellophane sheet S just after leaving the drier and prior to wind-up on the mill roll. Sheet S passes under roll 12 and over roll 13. Brackets 14 which support roll 13 extend upwardly and also support sample pick-up roller 15 loosely journaled in slot 16 whereby the sample is free to build up as it is collected on roller 15. A cross shaft 20 is journaled in upright standards 21, 21 and is keyed to a bracket 22 having an extension 23 which cooperates with a latch 24 so that the cutter assembly may be retained in a pivoted disengaged position. Alternatively the latch 24 may be dispensed with and the cutter assembly pivoted through an arc of approximately 180° to keep it out of the way. A threaded shaft 30 is journaled in brackets 22, 31, 32 and 33 and is axially retained therein by means of a thrust collar 34 and the hub of hand wheel 35. Brackets 22 and 33 are relatively permanently keyed and clamped to shaft 20. Brackets 31 and 32 are adjustably keyed to the shaft where as brackets 36 and 37 are slidable on shaft 20. The trailing ends of brackets 32 and 36 as well as brackets 31 and 37 carry a sharp slitting blade 40 retained thereon by means of a cover plate 41 and screw 42 (see Figure

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3). The blades are adjustable with respect to the brackets by means of a universal type mounting controllable by the nuts 43, 43. Threaded portions 44, 44 of shaft 30 are secured thereto by means of clamps 45, 45 and cooperating internal threads on brackets 36 and 37 are so arranged that when shaft 30 is turned by means of hand wheel 35 the brackets 36 and 37 slide along shaft 20 to control the lateral spacing between the pairs of blades on the tips of the brackets. The right-hand pair of blades on brackets 31 and 37 (Figure 2) are shown adjusted for initial rupture of the running web. The blades are biased with respect to each other so that they form a slight V relationship when viewed both from the top and from the end.

In operation, the blades are adjusted to the starting position as shown by the position of brackets 31 and 37. This is done with shaft 30 raised and preferably retained by means of latch 24. With the correct initial clearance setting between each pair of blades which should be on the order of one-sixteenth of an inch, shaft 30 is lowered by pivoting the apparatus on shaft 20 until the assembly rests adjacent adjustable stop 46. As soon as the blades have penetrated the web, the sample between the slits will be picked up by the adhesive portions 47 on roller 15 either because the cohesion is sufficient to break the very narrow piece between the leading edge of the sample and the remainder of the web or because this initial severing has been performed manually by the operator. Soon after the initial formation of the slits with the blades spaced close together, the operator turns hand wheel 35 to widen the spacing to the position of the blades on brackets 32 and 36. The sample then builds up on roll 15 as shown in Figure 5. When sufficient sample has been obtained, the operator turns hand wheel 35 in the opposite direction to narrow the spacing between the blades, thus forming the trailing edge 48 which will be allochiral to the leading edge 49 of the sample (Figure 9). The blades are then raised manually or otherwise and latched in a disengaged position in readiness for taking the next sample. It will be understood that the pairs of blades may be spaced laterally in any desired number or location across the shafts 20 and 30. Samples may be taken near the edge or near the middle and the number and width of samples may be increased as desired so long as the sheet is not weakened to the point that it will rupture.

Referring now to Figures 6 and 7, a manual sampling tool comprises a framework 50 having a sample-collecting roller 51 journaled at one end, a handle 52 attached to the framework and a secondary lever or handle 53 pivoted on the assembly so that squeezing of the handle 53 against handle 52 actuates the blade holders 54 and 55 towards and away from each other by means of bell cranks 56, 56. One arm of each crank is located to be controlled by a downwardly projecting lug 57 on handle 53 (Figure 7), and an adjustable limit stop 58 controls the maximum separated distance for the blades 59 and 60 in the blade holders 54 and 55. The blade holders are suitably spring loaded at 61 to the closed or closely spaced position. Since both blade holders 54 and 55 pivot with respect to the frame, the sample obtained with the manual device shown in Figure 6 will have two points substantially midway between the edges as shown in Figure 8. Otherwise, the method of procedure and actuation of the blades is substantially as described in connection with the device of Figures 1-5.

We have therefore described a running web sampler for sheet materials and especially cellophane which is simple, foolproof and which invariably obtains excellent samples which may be used for various tests without damaging the web.

We claim:

1. A sampler for traveling sheet material comprising a support, a pair of slitting blade holders secured to the

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support, a slitting blade mounted in each blade holder, means connected with the blade holders for moving at least one of the blade holders laterally toward and away from the other blade holder, said blade moving means being capable of operation both before and after the slitting blades pierce the traveling sheet material, and a take-up roller supported adjacent the slitting blades, said roller having an adhesive surface to pick up the sample between the slits formed by the blades.

2. Apparatus in accordance with claim 1 in which both of the blade holders are capable of movement on the support.

3. Apparatus in accordance with claim 1 in which one of the blade holders is relatively fixed on the support, and the other blade holder is movable with respect thereto.

4. Apparatus in accordance with claim 1 in which the blades are biased in two planes with respect to each other.

5. A sampler for traveling sheet material comprising a support, a pair of slitting blade holders secured to the support, a slitting blade mounted on each blade holder, manually controlled means connected with the blade holders for moving at least one of the blade holders laterally towards the other blade holder, said blade moving means being capable of operation both before and after the blades pierce the traveling sheet material, and a take-up roller supported adjacent the trailing edges of said blades, said roller having an adhesive surface, said roller having a sheet material attracting surface.

6. A sampler for traveling sheet material and the like comprising a pair of slitting blade holders mounted on a shaft so mounted that it extends transversely across the traveling sheet material, a slitting blade mounted in each holder, means for rotating said shaft to move the blade holders from an inoperative position to a slitting position in the sheet material, a second shaft cooperating with at least one of the blade holders, means for moving said second shaft to control the lateral spacing of the blade holders with respect to each other, said blade holder moving means being capable of operation both before and after the blades have pierced the traveling sheet material, and a sheet material take-up roller mounted adjacent the slitting blades, said roller having an adhesive surface.

7. The method of obtaining a sample from a traveling sheet material which comprises the steps of initially and simultaneously forming two closely spaced slits in said traveling sheet material at spaced distances from either longitudinal edge of the material and from a substantially fixed point along the path of the material, directing the slits from the fixed point outwardly in opposite directions toward the longitudinal edges of the traveling sheet material to enlarge the spacing between the slits, removing the strip of sample sheet material between the slits at said fixed point along the sheet material path, directing the slits in the sheet material from the fixed point inwardly toward each other to narrow the spacing between the slits, and severing the sheet material sample from the traveling sheet material, said above steps being completed while maintaining intact the sheet edges.

8. The method of claim 7 including the step of manually severing the leading edge of the sample of the sheet material.

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