

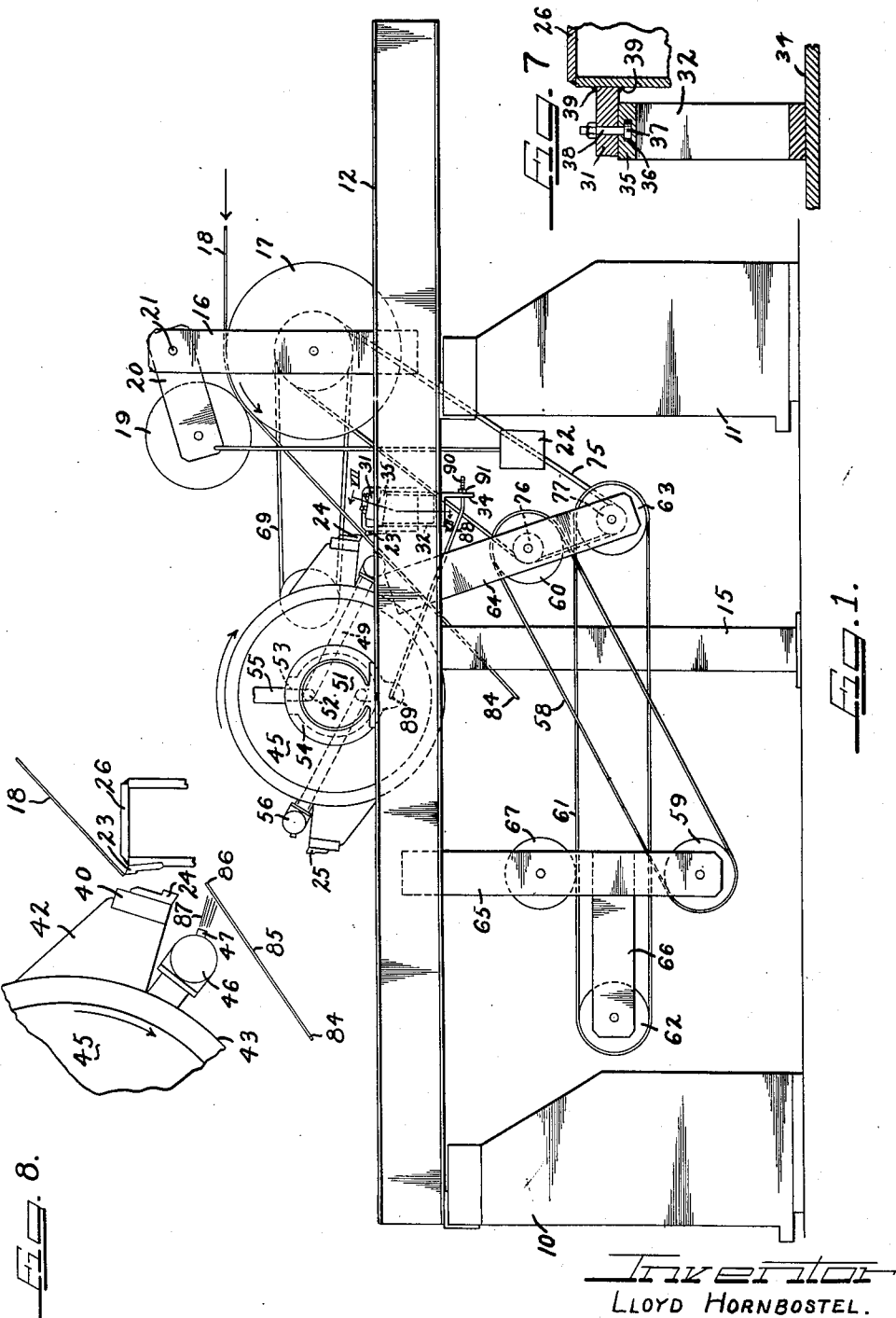
Oct. 28, 1952

L. HORNOSTEL
SHEET CUTTER

2,615,518

Filed May 1, 1947

3 Sheets-Sheet 1



The Sign of Charles H. Hild

Att. 1.

Oct. 28, 1952

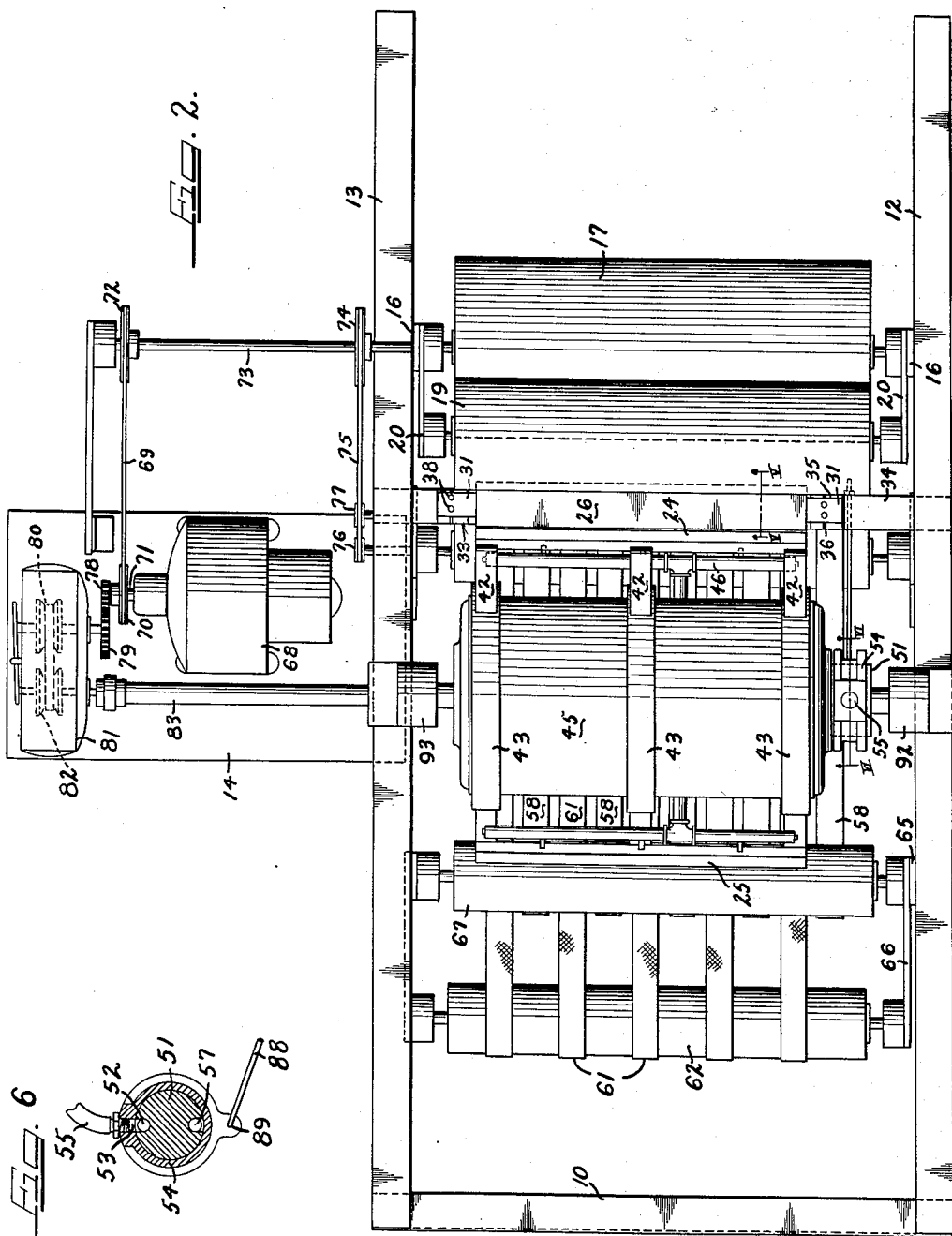
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Oct. 28, 1952

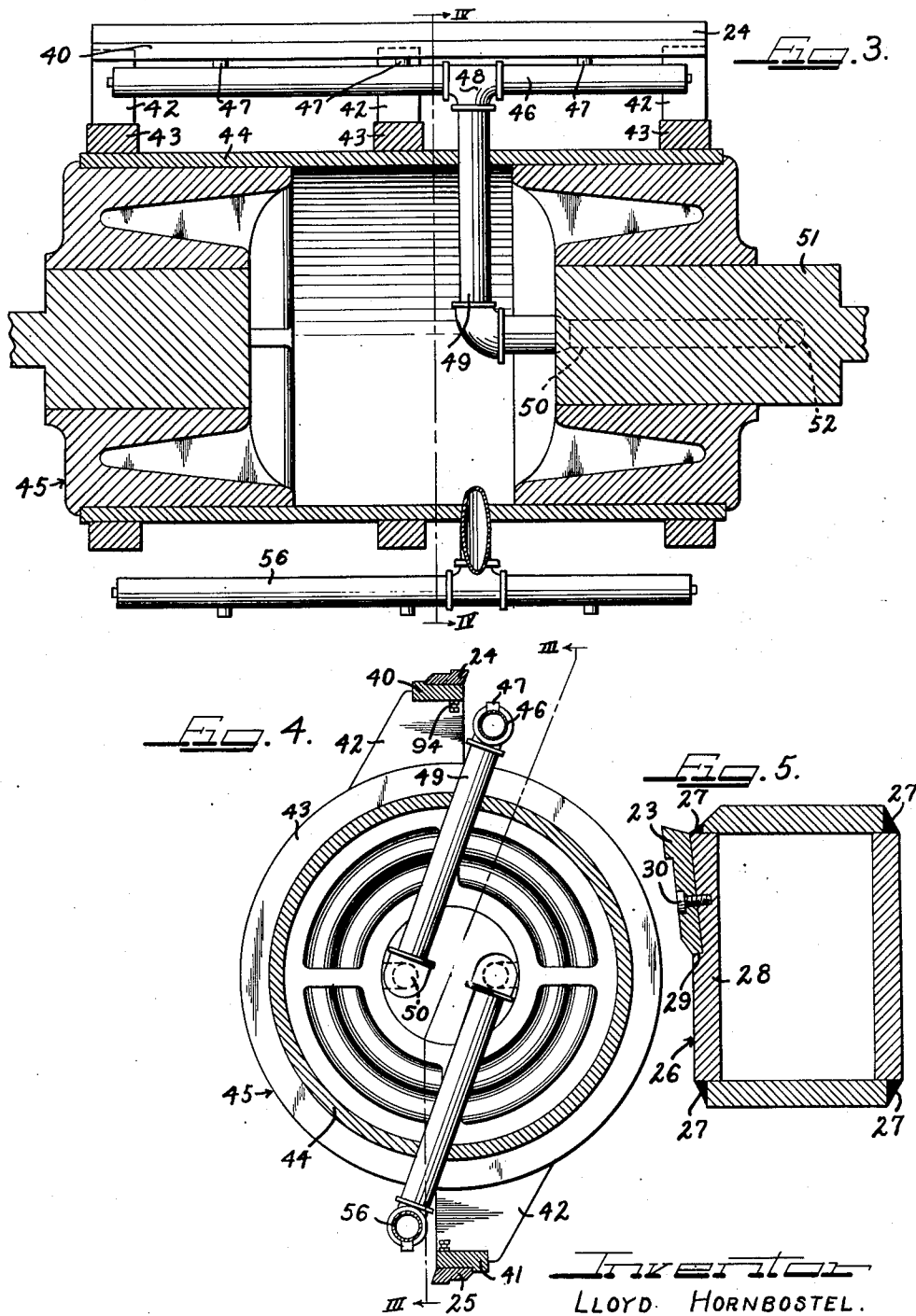
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UNITED STATES PATENT OFFICE

2,615,518

SHEET CUTTER

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Application May 1, 1947, Serial No. 745,144

4 Claims. (Cl. 164-68)

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This invention relates to a sheet cutter mechanism and more particularly to a mechanism for periodically severing individual sheets from the leading or oncoming end of a traveling web of material such as paper, paper board, etc.

In a conventional apparatus of the type under discussion, a continuous web of sheet material is fed over a stationary cutter bar and is severed periodically by coaction of a rotary cutter with the stationary cutter to produce individual sheets which are usually led away from the cutter mechanism by a suitable conveyor means. Since the whole operation is continuous it is necessary to gauge the cutting speed of the rotary cutter correctly in accordance with the rate of travel of the web in order that the individual sheets will be cut to the proper length and also in order that the rotary cutter will not catch or otherwise buckle the cut sheets as they leave the cutter knife.

As a mechanism of this type is designed to operate on a production basis, it is obvious that the faster the web is fed and cut into individual sheets, the more such sheets will be obtained per unit time. However, it is found that as the rotary cutter speed is increased, there is more tendency for the cutter to catch and buckle the individual sheets as they leave the cutter knife. Therefore, merely increasing the web speed and also increasing the speed of rotation of the rotary cutter will not result in satisfactory high speed operation.

I have found that by correctly choosing the angle of approach at which the web is fed to the cutter knife and by also providing means for forcing the trailing edge of a freshly severed sheet out of the path of movement of the rotary cutter, it is possible to obtain effective sheet cutting operation at higher speeds than are now commonly employed. For example, considering a type of mechanism employing a substantially horizontal stationary cutter blade with which a rotary cutter coacts to shear sheet material passed over the stationary cutter blade, I have found that by feeding the material to be cut over the stationary cutter blade at an angle of approximately 45° to the horizontal, it is possible to obtain a clean cut and at the same time make it possible to readily force the trailing edge of the freshly severed sheet out of the path of movement of the rotary cutter. If the web is fed over the stationary cutter blade at too great an angle to the horizontal, a messy cut results since the sheet material comes more nearly in line with the side surfaces of the cut-

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ter blades. On the other hand, if the sheet material is fed over the stationary cutter blade at too small an angle to the horizontal, difficulty is experienced in moving the trailing edge of the freshly severed sheet out of the path of movement of the rotary cutter with the result that there is a great tendency for the rotary cutter to catch and buckle individual sheets. As I have stated, I find that an angle of approach of approximately 45° is most satisfactory.

Furthermore, by providing means for directing an air blast against the freshly severed sheet adjacent its trailing edge as the sheet is severed and immediately following such severing, the trailing edge of the sheet is moved out of the path of movement of the rotary cutter and hence catching and buckling of the sheet by the rotary cutter is eliminated. A mechanism having the aforementioned features is found to be more satisfactory for high speed operation than mechanisms now known to the art.

I have also found that the use of a plurality of circumferentially spaced revolving blades makes possible a decrease in speed of rotation without loss in cutting capacity since the rotary cutter will make more than one cut per revolution. This arrangement cuts down vibration and renders a better balanced rotor.

It is, therefore, an object of my invention to provide a new and improved method and apparatus for severing sheets of material at a high rate of speed from a continuous length of such material.

It is another object of my invention to provide a new and improved method of severing individual sheets of material from a continuous length of material in the practice of which the continuous length of material is fed to the cutter knife at an angle of approach of approximately 45° and, following cutting of a sheet therefrom, the cut sheet is forced away from the path of movement of the cutter knife.

It is a further object of my invention to provide a new and improved mechanism for feeding a continuous length of material to a cutting means, periodically severing individual sheets of material from said continuous length, and forcing and leading said severed sheets away from said cutting means.

It is still another object of my invention to provide a new and improved mechanism for severing individual sheets of material from a continuous length of said material which includes means for directing an air blast against a freshly

severed sheet to force said sheet out of the path of movement of a movable cutter means.

It is a still further object of my invention to provide a new and improved mechanism for severing individual sheets of material from a continuous length of said material which includes means to feed said continuous length of material to a cutter knife at an angle of approach of approximately 45° thereto and also includes means to force the trailing edge of a freshly severed sheet out of the path of movement of a movable blade of said cutter knife.

It is another and further object of my invention to provide a new and improved sheet cutter mechanism which includes a stationary cutting blade and a multi-bladed rotating cutter wherein all of said blades are readily detachable from their supporting members thereby facilitating replacement of the blades and wherein said stationary blade is adjustable with respect to the path of movement of said rotating blade.

These and other objects and advantages of my invention will become apparent from the following detailed description taken in conjunction with the attached drawings in which:

Fig. 1 is a side elevational view of my mechanism showing a web about to be cut;

Fig. 2 is a top plan view of said mechanism, the web being omitted in this showing;

Fig. 3 is a sectional view taken lengthwise of the cylindrical member which supports the movable cutter blades as is indicated from line III—III of Fig. 4;

Fig. 4 is a cross-sectional view taken transverse of the axis of the cylindrical member which supports the movable cutter blades as is indicated from line IV—IV of Fig. 3;

Fig. 5 is a transverse cross-sectional view taken along the line V—V of Figure 2 and showing the means for supporting the stationary cutter blade;

Fig. 6 is a transverse cross-sectional view taken along the line VI—VI of Fig. 2 and showing the arrangement for supplying air to the conduits which feed the individual manifolds associated with each of said movable cutter blades;

Fig. 7 is a sectional view taken on line VII—VII of Fig. 1; and

Fig. 8 is a somewhat diagrammatic illustration showing the manner in which the air blast forces the trailing edge of a freshly severed sheet of material out of the path of movement of the adjacent movable cutter blade.

In the embodiment of my invention illustrated on the drawings, a pair of spaced frame stands 10 and 11 support a pair of spaced channel bars 12 and 13. These frame stands and channel bars constitute the main supporting framework for supporting the sheet cutter mechanism. A platform 14 extends to one side of the channel bar 13 and is supported by a vertical column member 15. This platform carries the machinery for driving the cutter mechanism as is described more in detail hereinafter.

On the feed side of the mechanism a pair of support bars 16 extend upward from the spaced channel bars 12 and 13 and a conveyor or draw roll 17 is supported for rotation by these bars. A web of sheet material 18 is shown in Fig. 1 as being fed over the draw roll 17.

A top press roll 19, which is supported for rotation between a pair of pivoted links 20 pivotally attached at 21 to the upstanding bars 16, bears against the web 18 on the draw roll 17 to hold the web against the draw roll and to deflect

the web downwardly toward the cutter knife. As can be observed from Fig. 1, the press roll 19 is positioned adjacent the delivery side of the draw roll 17 and, by virtue of such positioning, the web 18 is deflected from the horizontal and is fed to the cutter knife at an angle of approximately 45° to the horizontal. The positioning of the press roll 19 indicated is, of course, chosen to achieve a correct angle of approach and, as I have previously mentioned, I find an angle of approach of approximately 45° to be most satisfactory for high speed operation with a mechanism of the type illustrated. A weight 22 biases the roll 19 firmly against the traveling web 18 and by virtue of the coaction between the conveyor roll 19 and the draw roll 17 the web is effectively fed to the cutter knife in the manner indicated in the drawing.

This cutter knife includes a stationary cutter blade 23 and a pair of movable cutter blades 24 and 25. The stationary cutter blade 23 extends horizontally as indicated in Fig. 1 and is detachably connected to a bed or ledger bar 26 which also extends horizontally. As can be observed from Fig. 5, the bed bar 26, in cross section, is a four-sided hollow member in which the sides are connected by weld fillets as is indicated at 27. One side 28 of the bed bar is provided with a ledge surface 29 and the stationary cutter blade 23 is seated upon this ledge surface and detachably secured to the bed bar by means such as the metal screws 30 shown in Fig. 5. With the construction just described, it is readily possible to remove and replace the stationary cutter blade 23.

Referring more particularly to Figs. 1, 2, and 7, the bed bar 26 has, extending from each end thereof, a projection 31 and these projections rest upon upstanding support members 32 and 33 which are, in turn, carried by an angle iron member 34 attached to the underside of the channel bars 12 and 13. Referring more particularly to Fig. 7, it can be seen that the upstanding support member 32 includes a cover plate 35 which has formed therein a T-slot 36 adapted to receive the enlarged head 37 of a connecting bolt 38. The projection 31, of course, includes an opening which will receive the shank of the bolt 38 and hence by positioning the bolt in the T-slot 36 and then passing it through the matching opening in the projection 31, the connecting bolt 38 can then be tightened to secure the bed bar projection 31 to the upstanding support member 32. Inasmuch as the support member 33 is identical to the support member 32, the details of connection between member 33 and the corresponding projection 31 of the bed bar are identical to those described in connection with the support member 32.

To secure greater rigidity of connection, a plurality of bolts 38 is employed between each projection 31 and the upstanding support members 32 and 33. As a matter of practice, it is found desirable to incline the projections 31 and, correspondingly, incline the cover plates of the upstanding support members, such as the cover plate 35. With these members so inclined, when it is desired to adjust the position of the stationary cutter blade 23, this adjustment takes place along a line which intersects the axis of rotation of the movable cutter blades. Of course, since the projections 31 are rigidly attached to the bed bar 26 by being welded thereto as indicated at 39, and since the stationary cutter blade 23 is also screw connected to the bed bar 26, when

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the projections 31 are shifted with respect to the cover plates 35, both the bed bar and the stationary cutter blade are also correspondingly shifted. The T-slots 36 permit adjustment of the positioning of the stationary cutter blade.

The movable cutter blades 24 and 25 are detachably secured to support bars 40 and 41 respectively by means such as metal screws 94, and these support bars are, in turn, secured to a plurality of like brackets 42 which extend from bands 43 attached to and surrounding the shell 44 of a cylinder designated generally by the reference numeral 45. The cylinder 45 is supported for rotation by journal members 92 and 93 mounted, respectively, on the channel bars 12 and 13. As can be observed from the drawings, the movable cutter blades 24 and 25 are parallel to and substantially equal in length to the stationary cutter blade 23. In the embodiment of my invention illustrated in the drawings, three band members 43 surround the shell 44 of cylinder 45 and, to support each movable cutter blade, a bracket member 42 extends from each of the bands 43. Hence, there are three brackets 42 for each of the blades 24 and 25.

Each of the movable blades 24 and 25 has positioned adjacent thereto and substantially parallel therewith a manifold for directing air streams outwardly from the cylinder 45 as the movable blade coacts with the stationary blade. Since there is an identical manifold arrangement associated with each blade, only one such arrangement will be described in detail and that is the arrangement associated with the movable blade 24. In this arrangement, a manifold 46 extends substantially the length of the movable cutter blade 24. This manifold has a plurality of nozzles 47 which project outwardly from the manifold so as to direct individual air streams beneath the cutter blade 24. As indicated in Fig. 3, the nozzles 47 are spaced apart so that an individual air stream is projected from the manifold at spaced points along the length of the manifold.

By means of a T-connection 48, the manifold 46 is connected to a conduit 49. This conduit 49 connects with a passage 50 extended through the cylinder shaft member 51 to an inlet 52 which is adapted to register with an outlet 53 formed in a ring 54 which surrounds the cylinder shaft member 51. Air, from a source not shown, is supplied to the outlet 53 through a feed conduit 55. As previously mentioned, the arrangement for the manifold 56 associated with the movable blade 25 is identical to that just described in connection with the manifold 46 associated with movable blade 24 and hence it is deemed unnecessary to repeat details of description with respect to manifold 56. It might be noted, however, that an inlet 57 is adapted to register with the outlet 53 to supply air to the manifold 56 in the same manner as air is supplied to the manifold 46 through registration of the inlet 52 with the outlet 53.

Following cutting of the web 18 by coaction of the stationary cutter blade 23 with either of the movable cutter blades 24 or 25, the individual freshly severed sheets drop down upon a plurality of inclined conveyor tapes 58 which are trained between rolls 59 and 60 positioned generally beneath the cylinder member 45 as is shown in Fig. 1 of the drawings. As the fixed and movable blades coact to sever the web, a plurality of air streams are directed against the freshly severed sheet adjacent its trailing edge

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to force the sheet out of the path of movement of the rotary cutter blade. This action of the air blast means, plus the force of gravity, causes the individual sheets to drop quickly onto the inclined conveyor tapes 58. The tape-supporting rolls 59 and 60 extend substantially the distance between the channel bars 12 and 13, as viewed in Fig. 2, the individual endless tapes 58 are spaced apart along these conveyor rolls to occupy a distance thereon which is substantially equal to the length of the cylindrical member 45.

A second set of conveyor tapes 61 is entrained about rolls 62 and 63. These last mentioned rolls are each of a length substantially equal to the length of the rolls 59 and 60 and each of the rolls 62 and 63 has its axis extending substantially horizontally. As can be seen from Fig. 1, these rolls 62 and 63 are positioned so that the portions of the conveyor tapes 61 extending therebetween are also substantially horizontal. The individual conveyor tapes 61 are spaced apart sufficiently to receive, between each pair of tapes, a conveyor tape 58 and conversely, as has previously been mentioned, each pair of tapes 58 has a tape 61 traveling therebetween.

By virtue of this arrangement, there is an inclined conveyor formed of a plurality of individual belts 58 delivering conveyed material to a substantially horizontal conveyor arrangement also formed of a plurality of individual belts 61.

The rolls 60 and 63 are supported for rotation by journal members secured to depending arms 64 extending downward at an angle from channel members 12 and 13 as shown in Figs. 1 and 2. Conveyor roll 59 is supported by journal members carried by depending arms 65 which are also attached to and extend downward from channel bars 12 and 13. A pair of arms 66 are attached to the downwardly extending arms 65 and extend at substantially right angles therefrom, as shown in Fig. 1, to provide a journal support for the conveyor roll 62. A bias roll 67 is also supported by the downwardly extending arms 65 and this bias roll presses against the upper surface of the traveling belts 61.

Power supply for operating the sheet cutter mechanism is furnished by a motor 68 which is supported upon the platform 14 which extends to one side of channel bar 13, as is shown in Fig. 2. A chain or belt 69 extends between a sprocket or sheave 70, secured to and rotatable with the motor shaft 71, and a sprocket or sheave 72 which is rigidly secured to shaft 73 of draw roll 17. Another sprocket or sheave 74 is affixed to draw roll shaft 73 and a chain or endless belt 75 is entrained over sprocket sheave 74 and also over sprockets or sheaves 76 and 77 which are attached, respectively, to the shafts of the tape driving rolls 60 and 63. By virtue of these power supply connections, the draw roll 17 and rolls 60 and 63 will all rotate in the same direction which, for the arrangement shown in the drawings, will be counterclockwise.

A gear 78 is also secured to and rotatable with the motor shaft 71. This gear 78 meshes with and drives a second gear 79 which, in turn, drives one pulley 80 of a conventional variable speed pulley arrangement designated generally by the reference numeral 81 and illustrated in dotted outline in Fig. 2. This variable speed drive is of the well known type employing two adjustable V-shaped pulleys 80 and 82 with a belt connection therebetween and a linkage for increasing or decreasing the effective diameter

of the respective pulley surfaces engaged by the belt to vary the speed of the driven shaft. Since this type of a drive is well known to the art, no further explanation thereof is deemed necessary and it is to be understood that this type of drive furnishes a variable speed drive whereby the speed of driven shaft 83 can be varied as desired relative to the speed of the shaft 73. Rotation of shaft 83 causes rotation of cylinder 45, and, of course, since this cylinder supports the blades 24 and 25, these blades are likewise rotated at a speed dependent upon the speed of rotation of shaft 83. With this arrangement it is possible to vary the speed of rotation of the movable cutter blades 24 and 25 as desired and to choose the correct speed for a particular cutting operation.

The mechanism described above operates as follows:

A continuous length of web of sheet material 18 is fed from a source such as a roll (not shown) over draw roll 17 and is extended over and against the stationary cutter blade 23 in the manner shown in Fig. 1. By virtue of the positioning of the press roll 19, the continuous web 18 is deflected from the horizontal at an angle of approximately 45° to the horizontal and hence, since the stationary cutter blade 23 also extends horizontally, the web can be described as having an angle of approach to the cutter knife of approximately 45°. The angle of approach can be varied somewhat, but angles within the range of 35° to 55° are preferred.

When the motor 68 is energized, the sheave 70 drives belt 69, which, in turn, drives sheave 72 to rotate shaft 73 and hence rotate the draw roll 17 to feed web 18 toward the cutter knife. By virtue of belt 75 which is entrained about sheaves 74, 76 and 77, both conveyor rolls 60 and 63 are rotated to drive the respective groups of conveyor belts 58 and 61. Since the conveyor rolls 60 and 63 are rotated in a counterclockwise direction, the direction of travel of belts 58 and 61 is such as to lead individually cut sheets away from the cutter knife.

Simultaneously with the driving of the draw roll 17 and the conveyor rolls 60 and 63, the cylinder member 45 is also rotated by virtue of its shaft 83 and the connection of this shaft through the variable speed mechanism 81 to gear 79 which is driven by gear 78 attached to the motor shaft 71. As indicated by the arrow in Fig. 1, the cylinder member 45 is rotated in a clockwise direction. This cylinder member is positioned so that the movable cutter blades 24 and 25 are adapted to coact with the stationary cutter blade 23 to sever the web 18 across its width. Hence, as the web is fed to the cutter, the cutter is rotated to bring the movable blades 24 and 25 into periodic coaction with the stationary cutter blade 23.

Since in the preferred embodiment of the invention shown in the drawings I show two movable cutter blades, the web 18 will be cut twice during each revolution of the cylinder 45. The length of the cut sheet will depend upon the rate of feed of the web past the stationary cutter blade and also upon the time it takes after one cut has been completed before the next cutter blade coacts with the stationary blade to sever the web again. By means of the variable speed control 81 which controls the speed of rotation of the cylinder 45, it is possible to adjust the cutting speed so that a determinable length of material will be cut each time a mov-

able blade coacts with the stationary cutter blade.

When a cut has been completed and a length of material has been fed over and against the stationary cutter blade 23 in preparation for the next cut, the positioning of the web with respect to the blades which coact for the next cut will be as shown in Fig. 1. As shown, the leading edge 84 of the web 18 has traveled past the stationary cutter blade 23 to the extent indicated. The movable blade 24 is just about to coact with the stationary cutter blade 23 to sever the web transversely or along a transversal. At this time, the air outlet 53 in the ring member 54 which surrounds the cylinder shaft portion 51, is in registry with the air inlet 52. Accordingly, there is a continuous air path extending from outlet 53 through inlet 52, passage 50, and conduit 49 to the manifold member 46. The air supplied to the manifold 46 issues from the spaced nozzles 47 beneath and in advance of the movable cutter blade 24 as this blade coacts with the stationary cutter blade 23 to sever the web 18 along the severing transversal and air also issues from these nozzles for a short period of time immediately following the cutting operation to insure that the cut sheet of material is forced away from the movable cutter blade 24.

As shown in Fig. 8, the movable cutter blade 24 has just moved past stationary cutter blade 23 to sever the web 18. Air issuing from the nozzles 47 impinges against the cut sheet 85 adjacent its trailing edge 86 in the manner shown in Fig. 8. Although only one air stream 87 is shown in this figure, there are three such air streams 87 and they impinge against the cut sheet 85 adjacent its trailing edge 86 at three areas spaced along the width of the cut sheet in accordance with the spacing of the nozzles 47 as is shown in Figs. 2 and 3. By virtue of the plural air streams being directed against the cut sheet adjacent its trailing edge, this trailing edge is forced down and out of the path of travel of blade 24. Such action prevents the blade 24 from catching the trailing edge 86 and buckling the cut sheet 85. After the freshly severed sheet 85 is directed away from movable cutter blade 24 in the manner just explained, it drops upon the inclined conveyor belts 58 which carry it onto the horizontally traveling conveyor belts 61 and it is led away from the cutter knife by these last mentioned belts.

The position of air outlet 53 is adjustable so that registration of either of the air inlets 52 and 57 with outlet 53 will occur as the movable cutter blades 24 and 25 respectively coact with the stationary cutter blade 23. To hold the ring 54 and hence outlet 53 in the correct position, and also to permit some adjustment in positioning where necessary, a tie rod 88 is provided. This tie rod is connected at one end 89 to the ring member 54 and has a threaded extension 90 at its other end extended through angle member 34. By means such as nut 91, the amount of take-up on the tie rod 88 can be varied to obtain the correct positioning of outlet 53. In this manner the outlet 53 can be adjusted to have full registration with either of the inlets 52 and 57 when the individual cutter blades 24 and 25 coact with the stationary cutter blade 23, or the outlet can be positioned to achieve less than full registration at the time of such coaction.

The sequence of events described with reference to the coaction of blade 24 with stationary blade 23 is the same when blade 25 coacts with the

stationary blade. While I have shown two blades as being carried by the cylinder 45, it is obvious that only one blade could be employed if desired or, under certain conditions of operation, it may be desirable to employ more than two blades. However, for the speeds of operation usually encountered in apparatus of this type, I prefer to employ a two-blade arrangement for the rotary cutter substantially as shown on the drawings. With this arrangement it is not necessary to rotate cylinder 45 as fast as would be necessary if only a single cutter blade were carried thereby. However, even with the two-blade arrangement shown on the drawings, the blades will travel approximately 20% faster than the web 18 travels, and, accordingly, the air blast arrangement shown for forcing the trailing edge of a freshly severed sheet out of the path of travel of a movable blade is a necessary factor for successful high speed operation. Otherwise, the movable blade travelling faster than the cut sheet would tend to catch and buckle it. By employing an air blast arrangement of the type shown, even when a single blade is carried by the cylinder 45 and consequently the cylinder rotates faster than with a two-blade arrangement, the cut sheet can be successfully forced out of the path of travel of the rapidly moving single blade.

From the foregoing description it will be seen that I have provided a sheet cutter mechanism for severing sheets of material from a traveling web of said material which is reliable in operation and susceptible of high speed use, thereby enabling the obtaining of more sheets per unit time than is obtained by conventional types of apparatus. The combination of a correct angle of approach of the web to the cutter mechanism plus the means for forcing individual cut sheets of material out of the path of travel of the movable cutter blade successfully avoids catching of these cut sheets by the movable cutter blade. Furthermore, individual parts of the apparatus, such as the stationary cutter blade and the movable cutter blades, can be readily removed and replaced if necessary and the stationary cutter blade is readily adjustable to achieve correct positioning thereof with respect to the movable cutter blades. Means are provided to adjust the speed of rotation of the movable cutter blades and the time of air blast delivery, and the whole mechanism, in the manner above described, is driven from a single power source.

While I have shown and described a particular embodiment of my invention, I wish it to be understood that I do not intend to be restricted solely thereto but that I do intend to cover all modifications thereof which would be apparent to one skilled in the art and which come within the spirit and scope of my invention.

I claim as my invention:

1. A mechanism for severing individual sheets from a continuous length of flexible material, comprising: a rotatable blade having a cutting edge, a stationary blade having a cutting edge closely adjacent the path of movement of said rotating cutting edge for periodic shearing coaction therewith, means for feeding the flexible material between said blades, and means co-rotatable with said rotatable blade directing a fluid stream in advance of said rotatable blade toward the material immediately preceding during and

after shearing coaction of said blades for pressing the flexible material against said stationary edge during cutting of a sheet and for forcing the sheet out of the path of said rotatable blade after cutting thereof.

2. A mechanism for severing individual sheets from a continuous length of flexible material, comprising: a rotatable blade having a cutting edge, a stationary blade having a cutting edge closely adjacent the path of movement of said rotatable cutting edge for periodic shearing coaction therewith, means for feeding the flexible material downwardly about 35° to 55° from the horizontal between said blades, and means co-rotatable with said rotatable blade directing a fluid stream in advance of said rotatable blade toward the material immediately preceding during and after shearing coaction of said blades for pressing the flexible material against said stationary edge during cutting of a sheet and for forcing the sheet out of the path of said rotatable blade after cutting thereof.

3. The method of severing individual sheets from a continuous length of flexible material, comprising: feeding the material past and against a cutter blade, rotating another cutting blade into shearing coaction with the first mentioned blade to sever the flexible material, and directing a fluid air stream against the material in generally fixed advanced relation to the rotating blade immediately preceding during and after shearing coaction of said blades for pressing the flexible material against the first mentioned blade during cutting of a sheet and for forcing the sheet out of the path of the rotating blade after cutting.

4. The method of severing individual sheets from a continuous length of flexible material, comprising: feeding the material downwardly about 35-55° from the horizontal past and against a cutter blade, rotating another cutter blade into shearing coaction with the first-mentioned blade to sever the flexible material, and directing a fluid air stream against the material in generally fixed advance relation to the rotating blade immediately preceding during and after shearing coaction of said blades for pressing the flexible material against the first mentioned blade during cutting of a sheet and for forcing the sheet out of the path of the rotating blade after cutting.

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