

May 2, 1950

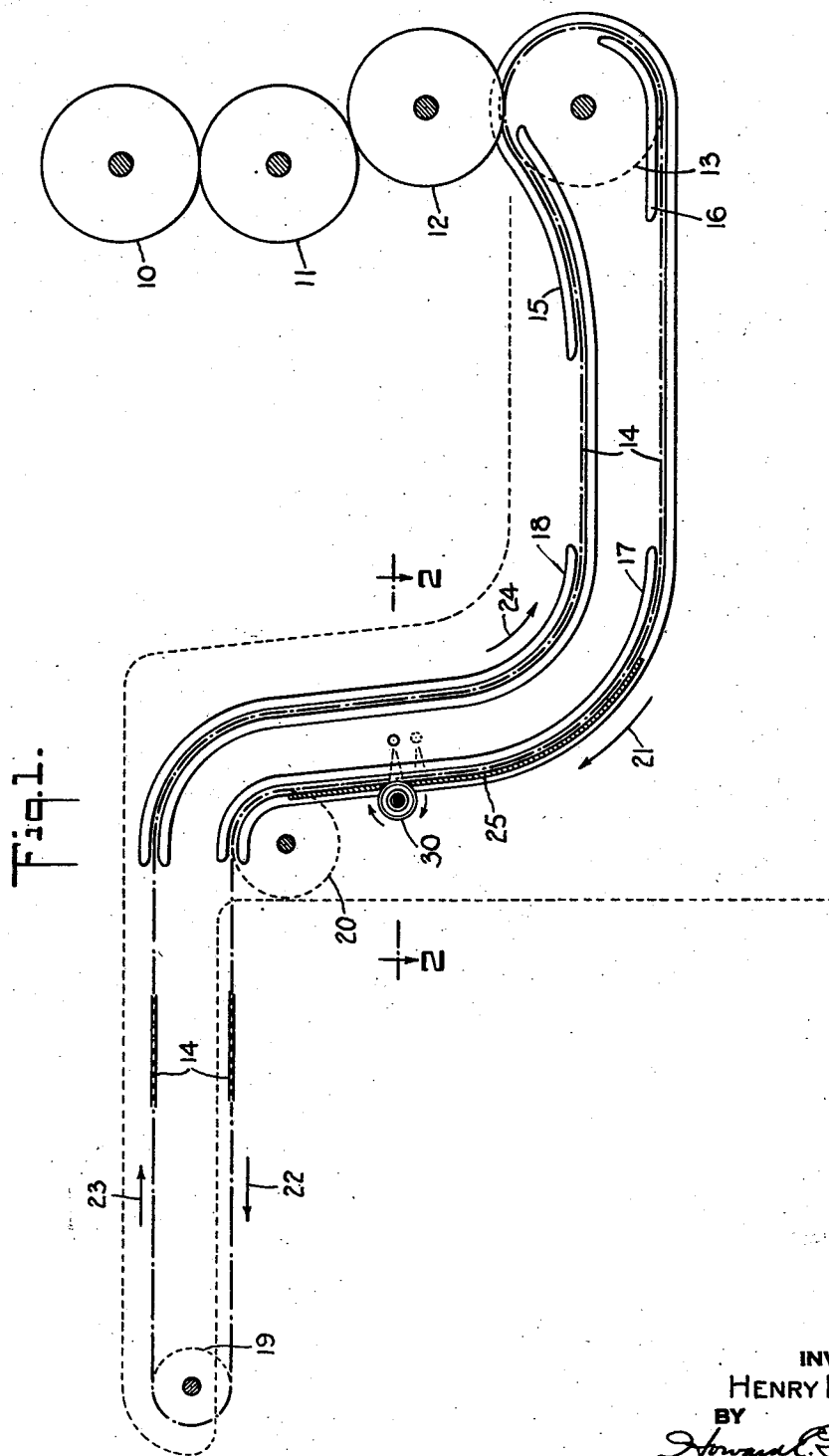
H. B. DONNING

2,506,445

SHEET CUTTING APPARATUS FOR PRINTING PRESSES

Filed Aug. 28, 1945

3 Sheets-Sheet 1



INVENTOR ·
HENRY B. DONNING

BY

Howard C. Thompson
ATTORNEY

May 2, 1950

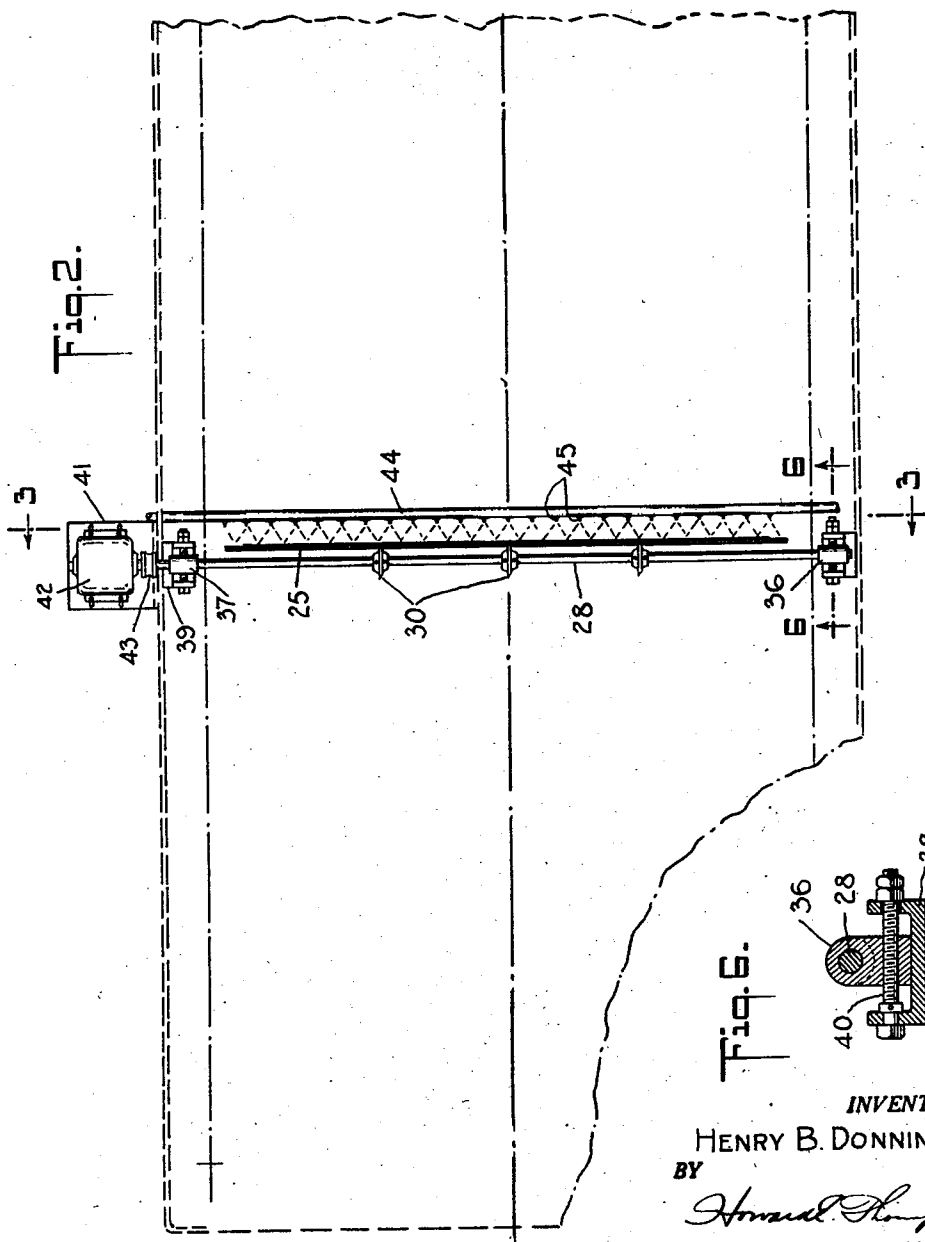
H. B. DONNING

2,506,445

SHEET CUTTING APPARATUS FOR PRINTING PRESSES

Filed Aug. 28, 1945

3 Sheets-Sheet 2

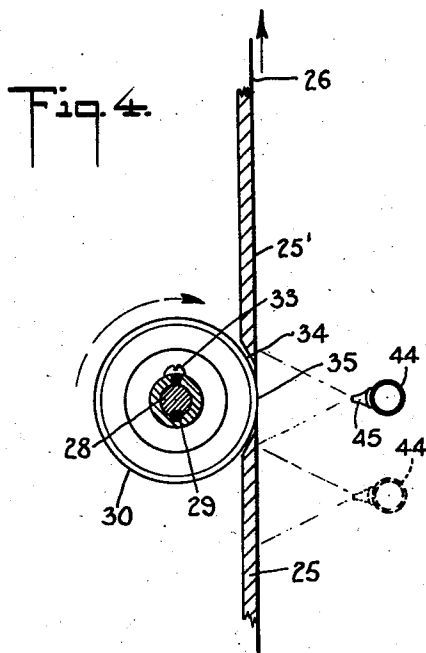
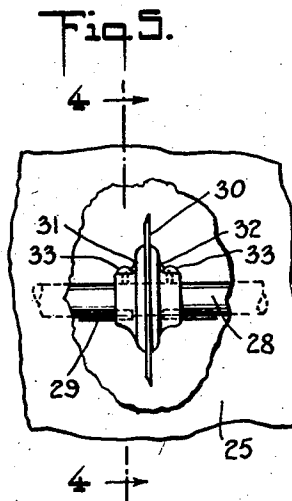
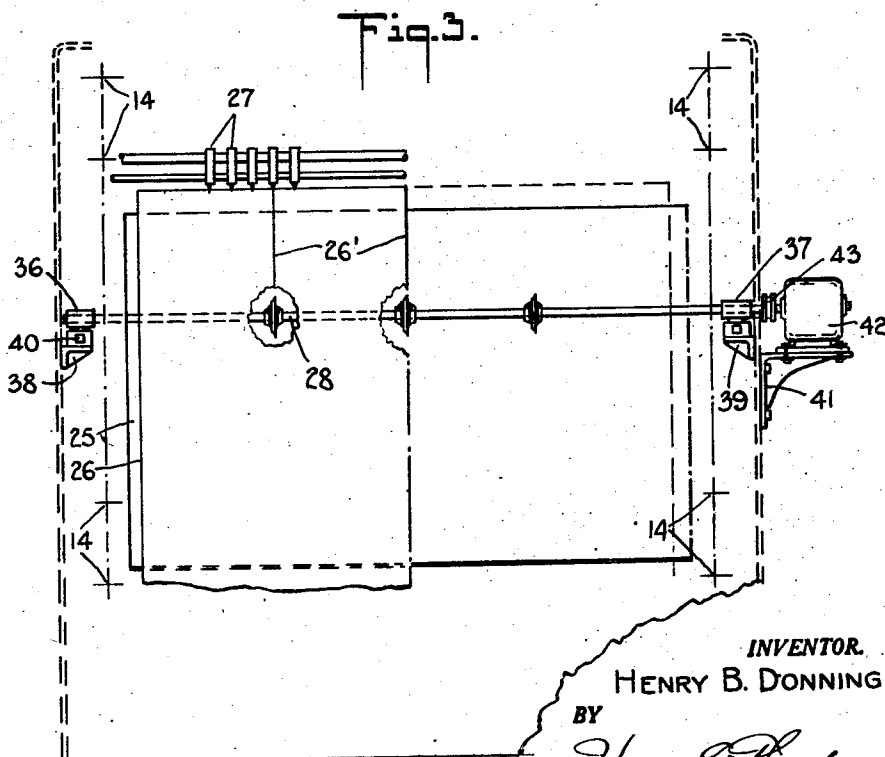


INVENTOR.
HENRY B. DONNING
BY
Harold Thompson
ATTORNEY

Filed Aug. 28, 1945

SHEET CUTTING APPARATUS FOR PRINTING PRESSES

3 Sheets-Sheet 3



INVENTOR.
HENRY B. DONNING
BY
Howard E. Thompson
ATTORNEY

UNITED STATES PATENT OFFICE

2,506,445

SHEET CUTTING APPARATUS FOR
PRINTING PRESSES

Henry B. Denning, New Rochelle, N. Y.

Application August 28, 1945, Serial No. 613,091

11 Claims. (Cl. 164-61)

1

This invention relates to printing presses. More particularly, the invention deals with a mechanism disposed along the path of travel of a sheet through the press for cutting the sheet into two or more parts prior to delivery of the sheet from the press. Still more particularly, the invention comprises the use of a series of relatively adjustable cutters, with pneumatic means for moving or supporting the sheet adjacent the cutters in the operation of severing the sheet into separate parts. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic side view of a printing press outlining only part of the press construction and showing the general arrangement of my improved cutter mechanism thereon.

Fig. 2 is a diagrammatic sectional view substantially on the line 2-2 of Fig. 1, with parts of the construction shown in elevation.

Fig. 3 is a section substantially on the line 3-3 of Fig. 2.

Fig. 4 is an enlarged sectional detailed view, the section being substantially on the line 4-4 of Fig. 5.

Fig. 5 is a face view of the structure shown in Fig. 4, with part of the structure broken away; and

Fig. 6 is a section on the line 6-6 of Fig. 2.

In order to illustrate one adaptation and use of my invention, I have diagrammatically outlined in Fig. 1 of the drawing a part of a printing press in which 10 represents a plate cylinder, 11 a blanket cylinder, 12 an impression cylinder and 13 the skeleton cylinder having sprocket ends for actuating a work sheet conveyor or feed, indicated in dot and dash lines at 14. The chain passes over suitable guides as at 15, 16, 17 and 18 around an end sprocket 19 at a higher level than the drive sprocket, and also over a guide sprocket 20 disposed at the upper end of the chain guide 17. The chain 14 is shown partially in detail at the upper left portion of Fig. 1, and this chain has at spaced intervals the usual grippers for engaging the sheets, as they pass from the cylinder 13 and are carried upwardly and then to the left for final delivery, as indicated by the arrows 21 and 22. The sheets are fed to the impression cylinder along the conveyor chain in the direction of the arrows 23 and 24.

In practice I employ along the path of movement of the printed sheets and associated with the upstanding portion of the guides 17 a sup-

2

porting plate or wall 25, which plate is shown in cross section in Figs. 2 and 4 of the drawing, and shown in front elevation in Fig. 3 and partly in Fig. 5. This plate is of a width greater than the width of the sheet 26 being printed, note Fig. 3. In this figure, a view of the chain grippers 27 are shown engaging one end of the sheet 26 in moving the sheet through the machine.

Arranged rearwardly and transversely of the plate or wall 25 adjacent the upper end thereof is a shaft 28 having an elongated key 29 to provide adjustable mounting of disc type cutters 30 longitudinally of this shaft. The cutters 30 are supported between opposed hub portions 31 and 32, each slotted to receive the key 29, and also having set screws 33 to retain the cutters in predetermined positions of adjustment longitudinally of the shaft 28. Any suitable means may be provided for keying the cutter disc 30 to the hub portions. The plate or wall 25 will have spaced elongated apertures or openings 34 in connection with which the cutters 30 are aligned and into which the cutters pass so as to protrude the cutter blades slightly beyond the front surface 25' of the plate 25, as seen at 35 in Fig. 4 of the drawing. The ends of the shaft 28 are supported in bearings 36 and 37, the latter being adjustably supported on brackets 38 and 39 secured in the press frame, adjustment being through the medium of screw bolts, one of which is shown in detail at 40 in Fig. 6 of the drawing. This adjustment is to compensate for the wear on the disc cutters and reduction in diameter in re-grinding of cutters. At one side, adjacent the bracket 39, is another motor supporting bracket 41 upon which is adjustably supported a motor 42, the adjustment being longitudinally of the press in compensating for adjustments of the bearings 36 and 37. At 43 is shown a flexible coupling between the motor shaft and the shaft 28.

Adjustably supported in any desired manner in the press, forwardly of the plate 25, is an air discharge tube 44, which may be positioned from the full line position of Fig. 4, to the dotted line position shown in said figure, air being supplied to this tube or pipe through one end thereof in any desired manner. The pipe has a series of nozzles 45 spaced longitudinally thereof, note Fig. 2 of the drawing, through which air under pressure is discharged in the direction of the surface 25' of the plate 25, preferably along an area of this surface adjacent the spaced openings 34, so as to form what may be termed a wide column of air which will operate to support the printed sheet 26 in firm engagement with that part of the surface 25' through which the cutter edges,

3

as at 35 are exposed, so that as the sheet 26 is drawn upwardly over the surface 25', the sheet is slit and cut in as many places as cutters are arranged, for example, the slits 26' shown centrally and at the left of Fig. 3 of the drawing.

In the present construction, three cutters 30 are employed, thus three slits or cuts will be made in the printed sheet 26, dividing the original printed sheet into four printed sheets, which will be delivered from the press at a point adjacent the sprocket 19 and in accordance with conventional press practice. It will be understood that the blast of air discharged from the nozzles 45 will be constant on the sheet 26 from the time that one end of the sheet is brought into registering position with the cutters 30, and until the other end of the sheet has passed beyond the cutters to insure cutting of the complete length of the sheet, and forming independent printed sheets delivered from the press.

It will appear from a consideration of Fig. 1 of the drawing that the plate 25 is arranged just rearwardly of the conveyor chains and the grippers carried thereby, so that the sheet is guided over the surface of the plate 25 and at the same time the air discharge tube together with its nozzles are widely spaced from the surface of the plate to provide free passage of the conveyor and grippers over the surface 25'.

It will be apparent that while I have shown my invention as applied to a press of specific arrangement and design, that my invention is applicable to any type and kind of printing press where it is practical to associate the sheet shearing mechanism therewith. Furthermore, this mechanism is applicable to the cutting of sheets of any type in different apparatus where it is desired to cut a relatively wide worksheet or strip into narrower strips. In this respect, it will be apparent that the present illustration is intended to show only one adaptation and use of my invention.

Briefly stated, it may be said that my invention comprises a means or method of cutting or sub-dividing workpieces by pneumatically supporting the workpiece upon the surface of a rotatable cutter while the workpiece is drawn over the surface or periphery of the cutter. It is also preferred that the cutter blade or disc be rotated in a direction opposite to the path of drawing movement of the workpiece with respect to the cutter. This type of construction and method of procedure will materially increase the life of the cutter blades employed, and further will insure the formation of accurate and clean cuts in the workpiece. In adjustably supporting the cutters, along the drive shaft, a wide range of cuts in the workpiece is made possible. In the present showing, the spacing of the cutters is equal, but in some instances, irregular spacings would be provided in producing different widths in the resulting cut strips. It will also be apparent that different types and kinds of cutters may be employed, depending entirely upon the type and character of workpiece operated upon. In most instances, however, a continuous edge disc cutter will be employed, preferably bevelled to one side, as seen at 30' in Fig. 5 of the drawing, so as to facilitate sharpening or grinding.

For purposes of description, the printed sheet can be regarded as a workpiece which is moved or fed over the surface of a supporting member, with cutters so arranged with respect to the member as to have their edges exposed at said surface of the member to engage the workpiece as it is moved over said surface. In this connection it is to be

4

kept in mind that workpieces of different types and kinds can be so moved and cut by my improved cutting mechanism, utilizing the pneumatic means, such for example, as the blast of air to support the workpiece firmly upon the surface adjacent the cutters to insure cutting of the workpiece.

It will be apparent that my improved pneumatic mechanism utilized for control of the support or holding of a sheet or workpiece upon a surface, can be utilized in supporting or holding the sheet or workpiece on marking or workpiece engaging elements of any type or kind, where pressure engagement with the elements is desired or wherein it is desirable to firmly support and back-up the sheet or workpiece at or adjacent the point of engagement by the element or elements.

From the standpoint of discharge of the blast of air or series of spray discharges, it will be understood that this air may be controlled at a temperature which would be beneficial to assist drying or setting of a print or other deposit disposed on the sheet. Further, the spray discharges from the nozzle may also include a coating, finishing or other solution for characterizing or surfacing the sheet or workpiece as it passes through the machine.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In printing presses, the combination with means for feeding and guiding a sheet through the press, of a plate positioned along the path of movement of a printed sheet through the press, said plate having transversely aligned openings, means rotatably supporting a plurality of disc type cutters in registering position with the openings in said plate and for exposure through the surface of the plate to engage a sheet moved over said surface by said sheet feeding means, and means for discharging blasts of air in a long wide column onto that side of the sheet which is opposite to said plate to firmly urge the sheet against the surface of said plate adjacent, between and beyond said cutters to insure cutting the sheet in its passage over said surface.

2. In printing presses, the combination with means for feeding and guiding a sheet through the press, of a plate positioned along the path of movement of a printed sheet through the press, said plate having transversely aligned openings, means rotatably supporting a plurality of disc type cutters in registering position with the openings in said plate and for exposure through the surface of the plate to engage a sheet moved over said surface by said sheet feeding means, means for discharging blasts of air in a long wide column onto that side of the sheet which is opposite to said plate to firmly urge the sheet against the surface of said plate adjacent, between and beyond said cutters to insure cutting the sheet in its passage over said surface, and means for rotating said disc cutters.

3. In printing presses, the combination with means for feeding and guiding a sheet through the press, of a plate positioned along the path of movement of a printed sheet through the press, said plate having transversely aligned openings, means rotatably supporting a plurality of disc type cutters in registering position with the openings in said plate and for exposure through the surface of the plate to engage a sheet moved over said surface by said sheet feeding means, means for discharging blasts of air in a long wide column onto that side of the sheet which is opposite to

5

said plate to firmly urge the sheet against the surface of said plate adjacent, between and beyond said cutters to insure cutting the sheet in its passage over said surface, means for rotating said disc cutters, and means adjustably supporting the last named means and said cutters to control projection of cutters through the surface of said plate.

4. In printing presses, the combination with means for feeding and guiding a sheet through the press, of a plate positioned along the path of movement of a printed sheet through the press, said plate having transversely alined openings, means rotatably supporting a plurality of disc type cutters in registering position with the openings in said plate and for exposure through the surface of the plate to engage a sheet moved over said surface by said sheet feeding means, means for discharging blasts of air in a long wide column onto that side of the sheet which is opposite to said plate to firmly urge the sheet against the surface of said plate adjacent, between and beyond said cutters to insure cutting the sheet in its passage over said surface, means for rotating said disc cutters, means adjustably supporting the last named means and said cutters to control projection of cutters through the surface of said plate, the rotatable support for said cutters comprising an elongated shaft, and means adjustably supporting the cutters longitudinally of the shaft.

5. In printing presses, the combination with means for feeding and guiding a sheet through the press, of a plate positioned along the path of movement of a printed sheet through the press, said plate having transversely alined openings, means rotatably supporting a plurality of disc type cutters in registering position with the openings in said plate and for exposure through the surface of the plate to engage a sheet moved over said surface by said sheet feeding means, means for discharging blasts of air in a long wide column onto that side of the sheet which is opposite to said plate to firmly urge the sheet against the surface of said plate adjacent, between and beyond said cutters to insure cutting the sheet in its passage over said surface, means for rotating said disc cutters, means adjustably supporting the last named means and said cutters to control projection of cutters through the surface of said plate, the rotatable support for said cutters comprising an elongated shaft, means adjustably supporting the cutters longitudinally of the shaft, said air discharge means comprising an elongated tube having longitudinally spaced nozzles directed toward said plate, and said tube and nozzles being movable into different positions with respect to the surface of said plate adjacent the openings in said plate.

6. The combination with a printing press having sheet conveyor means, of means positioned at a predetermined point along the sheet conveyor means for cutting a sheet in movement through the press by said conveyor means, said last named means comprising a cutter, a support for the sheet adjacent the cutter, and means comprising air blasts forming a long wide column for forcing and holding a sheet against the support adjacent and beyond said cutter as the sheet is moved relatively to the cutter by said first named means.

7. The combination with a printing press having sheet conveyor means, of means positioned at a predetermined point along the sheet conveyor means for cutting a sheet in movement through the press by said conveyor means, said last named means comprising a cutter, a support for the sheet

6

adjacent the cutter, means comprising air blasts forming a long wide column for forcing and holding a sheet against the support adjacent and beyond said cutter as the sheet is moved relatively to the cutter by said first named means, and means adjusting the position of the cutter to control positioning thereof on said sheet.

8. The combination with a printing press having sheet conveyor means, of means positioned at a predetermined point along the sheet conveyor means for cutting a sheet in movement through the press by said conveyor means, said last named means comprising a cutter, a support for the sheet adjacent the cutter, means comprising air blasts forming a long wide column for forcing and holding a sheet against the support adjacent and beyond said cutter as the sheet is moved relatively to the cutter by said first named means, means adjusting the position of the cutter to control positioning thereof on said sheet, and means adjusting the position of the cutter toward and from the sheet.

9. An apparatus for cutting strips or sheet workpieces, a workpiece supporting member, cutters exposed through one surface of said member at spaced intervals, means for feeding the workpiece over said surface of the member and the cutters exposed therethrough, and means arranged transversely of the path of movement of said workpiece for directing a long wide column air blast onto the workpiece to firmly support the workpiece on said surface of said member adjacent, between and beyond all of said cutters.

10. An apparatus for cutting strips or sheet workpieces, a workpiece supporting member, cutters exposed through one surface of said member at spaced intervals, means for feeding the workpiece over said surface of the member and the cutters exposed therethrough, means arranged transversely of the path of movement of said workpiece for directing a long wide column air blast onto the workpiece to firmly support the workpiece on said surface of said member adjacent, between and beyond all of said cutters, said cutters comprising discs, a shaft supporting said discs, means adjustably supporting the discs longitudinally of the shaft, and means for rotating said shaft and the discs thereon.

11. The combination with means for feeding a workpiece through a machine and relatively to workpiece engaging elements arranged in predetermined position in the machine, of means for applying a wide column air blast onto the workpiece for moving the workpiece into engagement with said elements in the passage of the workpiece through the machine, and said means being arranged transversely of the path of movement of the workpiece through the machine whereby said column air blast will contact transverse successive sections of the workpiece as it passes through the machine.

HENRY B. DONNING.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
933,688	Atwood	Sept. 7, 1909
1,155,727	Harwood	Oct. 5, 1915
1,651,096	Molins	Nov. 29, 1927
1,939,925	Schwartz	Dec. 19, 1933
2,044,481	Manley	June 16, 1936