

Aug. 17, 1965

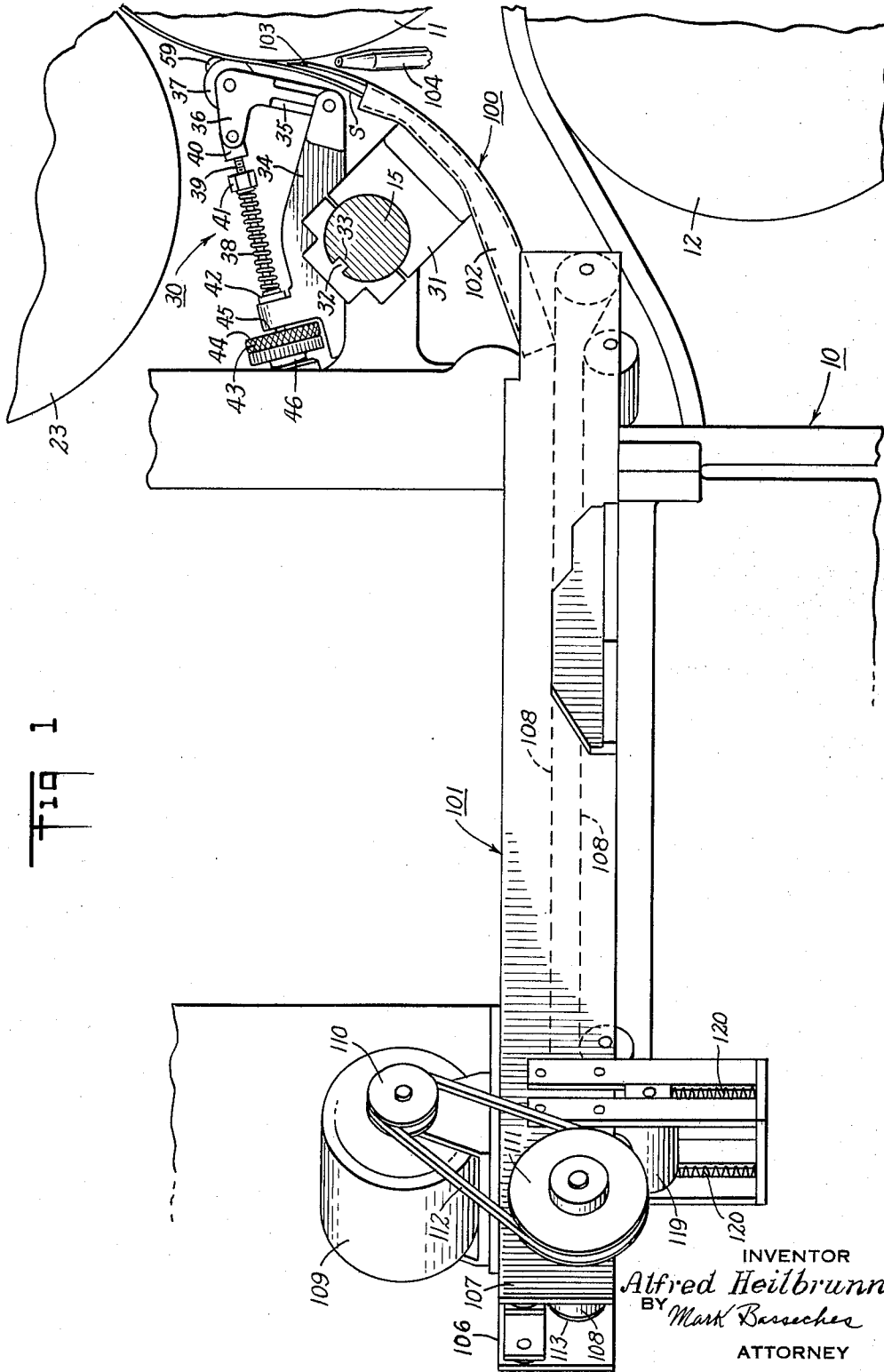
A. HEILBRUNN

3,200,685

DEVICE TO CUT EDGES OF SHEETS AND REMOVE SCRAP

Filed Feb. 4, 1963

3 Sheets-Sheet 1



Aug. 17, 1965

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DEVICE TO CUT EDGES OF SHEETS AND REMOVE SCRAP

Filed Feb. 4, 1963

3 Sheets-Sheet 2

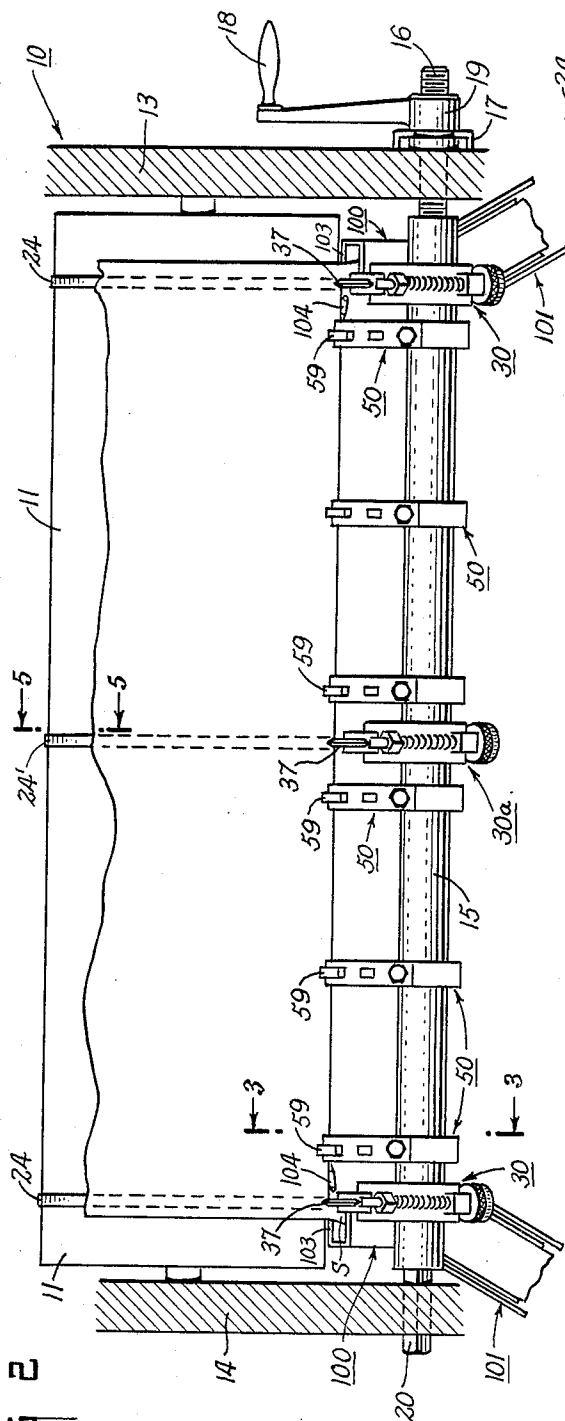


Fig 2

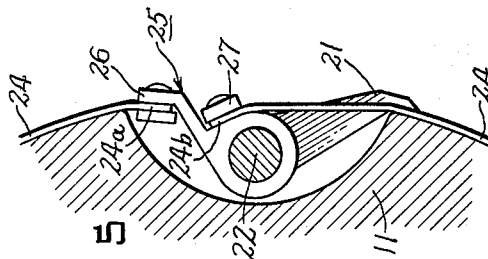


Fig 5

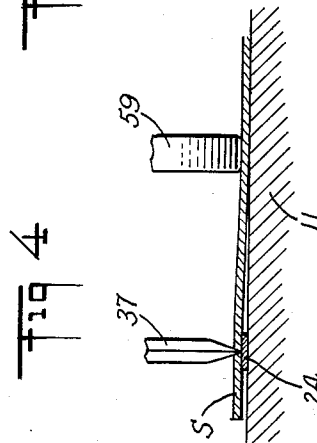


Fig 4

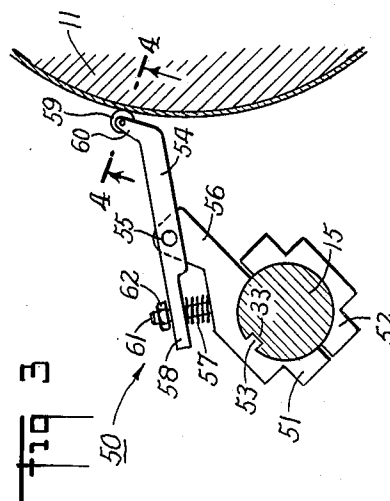
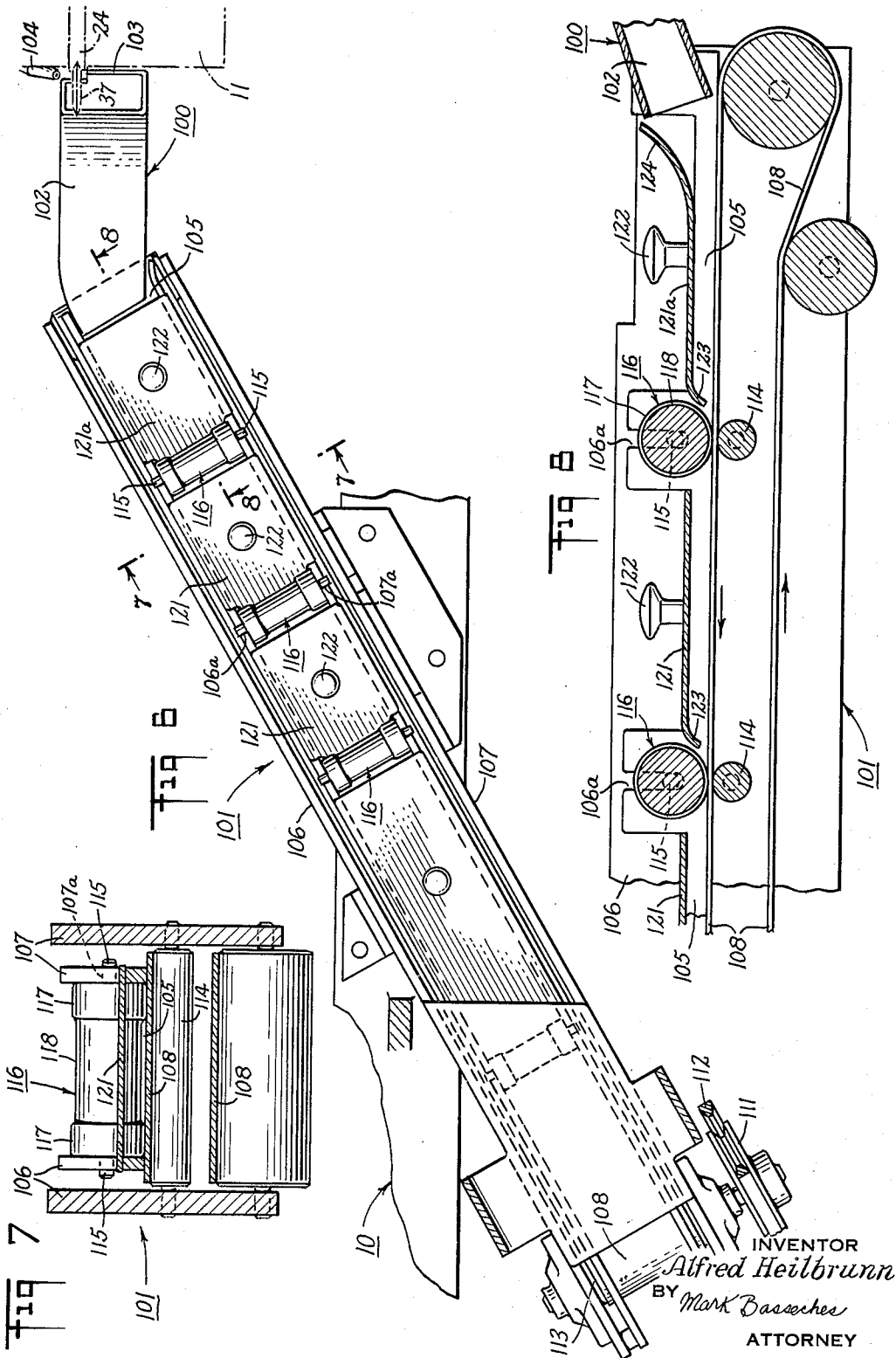


Fig 3

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3 Sheets-Sheet 3



1

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DEVICE TO CUT EDGES OF SHEETS AND REMOVE SCRAP

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Filed Feb. 4, 1963, Ser. No. 255,898

8 Claims. (Cl. 83—98)

This invention relates to a cutter device, and more particularly to a printing press and cutter device. Still more particularly, this invention relates to a printing press for printing discrete sheets as opposed to an extended web, such press including a novel cutting device for severing relatively thin marginal edge portions of sheets in the course of the printing process, whereby to provide printed sheets wherein the printing on the sheets is precisely located with respect to at least one marginal edge portion of the sheets.

Still more particularly, this invention relates to a high speed cutting and printing device for sheets whereby the printing is precisely located on the sheets with respect to certain marginal edges of the sheets.

This invention further relates to novel means for severing marginal edges of sheets during the printing process, which means include apparatus for clearing the severed scrap material formed in the course of the cutting operation from the remainder of the printing apparatus, to assure that the scrap will not foul the printing apparatus and thereby involve maintenance problems and requiring costly shut downs.

Still more particularly, this invention relates to means for severing marginal edges of sheets with extreme accuracy, whereby the edges of the resultant sheets are perfectly parallel with each other and are precisely oriented with respect to printing formed on the sheets in the course of severing the marginal edges.

Certain manufacturing operations require the formation of intermediate products comprising sheets of material having printing thereon. Said intermediate products are thereafter subjected to additional manufacturing steps, such as stamping, slitting, folding and the like. Where multi-color printing is desired, sheets first processed are thereafter fed through sequential printing operations, during which operations the images formed in the first printing step must be accurately oriented with respect to the images provided by the subsequent operations. For the additional manufacturing steps aforesaid to be performed accurately with respect to printed matter appearing on the sheets, it is necessary that the printed matter be located precisely with respect to at least certain of the marginal edges of the sheets. An example of such manufacturing process is the fabrication of novelty cards, such as are often distributed with chewing gum or like products. In such manufacture, a sheet printed with an entire series of the cards is located within an apparatus, which apparatus punches the sheet into a plurality of small cards, which cards are subsequently included in the package with the chewing gum or the like.

It will be readily recognized that for economical manufacture, the individual impressions on the sheets to be punched are preferably closely located one with respect to the other to minimize waste. However, such close orientation of the impressions creates problems, if the impressions themselves are not precisely located with respect to the marginal edges used to locate the sheets within the device for severing units from the sheets. Thus, for instance, if the impressions formed on the large sheet are disposed as little as $\frac{1}{16}$ " apart, and if the over-all impression on the large sheet is located as little as $\frac{1}{8}$ " away from the optimum position of location on

2

the large sheet, it will be evident that the sub-dividing process, wherein the cards are separated from the sheet, will be carried out in a manner to result in mutilation of the cards. The problem is magnified by the fact that the paper or cardboard sheets received from the manufacturers, while roughly similar in size, do not conform to the tolerances required where subsequent processing steps, such as those previously described, are to be carried out on the printed sheet. I have determined that the requisite accuracy of alignment of the printed matter relative to the edge is achieved only if the edge trimming and printing are simultaneously carried out.

In the past, a known expedient for providing parallel, accurately spaced apart marginal edges on cardboard has been continuously to advance an extended web of paper or cardboard beneath spaced slitter knives. It will be evident that the edges formed by the knives will be accurately spaced apart. Also, it is known to form parallel edges in a sheet by die stamping or otherwise maintaining the sheet on a flat surface. However, severing of the edges of sheets of material, as opposed to an extended web, presents problems not present in the slitting of a web. Moreover, attempts to form parallel sheets by slitting marginal edges therefrom while the sheets are being processed by being disposed about the periphery of a cylinder, such as the impression cylinder of a printing press, poses problems not involved in severing such edges from a web, or from a sheet while the sheet is supported on a flat surface. Specifically, attempts heretofore made to form parallel marginal slits along the side edges of a sheet while the same is being processed by an impression cylinder have, inter alia, resulted in the formation of sheets wherein the trailing portions are wider than the leading portions of the sheets.

I have discovered that by providing a cutting assembly as more fully hereinafter described, this problem is surmounted and sheets having accurate parallel edges may be formed by slitting away marginal portions of relatively non-uniform sheets during the printing of said sheets.

A further drawback to the development of apparatus for slitting away the marginal edges of sheets during the printing thereof has been the inability to cope with the marginal edge waste or scrap severed from the sheets. Particularly, the problem is aggravated by the lack of uniformity with which the strips are severed from the matrix portion of the sheet. In some instances, the scrap will be cleanly displaced from the remainder of the sheets and will fall clear of the sheets. In other instances, particularly after periods of long use of the apparatus, the scrap may, at certain points, remain partially connected to the matrix sheets. In either instance, it is possible that the scrap may fall free or be carried to an advance position with respect to the printing device, whereupon the same may be separated from the sheets at an intermediate position, thereby in certain instances falling into the chain drive of the machine and requiring removal of the scrap from the chain drive. Also, in certain instances, the scrap may become folded over upon itself and become interposed between the printing surfaces and the sheets, causing a blank or ink-free area on the sheets, and thus destroying the entire sheet.

Attempts in the past physically or mechanically to remove the scrap have been unsuccessful. Often such removal apparatus has caused the strips to tear or has been otherwise ineffective in separating the scrap from the sheets. By the novel apparatus hereinafter set forth, clean and consistent scrap removal is assured, the removed scrap being conducted to a convenient disposal point clear of the printing apparatus. Further, the removal apparatus assures that the strips are not torn in the course of removal.

3

Accordingly, it is an object of this invention to provide a printing apparatus for sheets of material whereby severing of marginal edge portions of the sheets may be accurately effected during the printing operation, to secure accurate coordination between the location of the printed matter and the edges of the imprinted sheets.

A further object of the invention is to provide a printing press having cutting apparatus for removal of marginal edges of printed sheets wherein a precise parallel condition of the marginal edges of the printed sheets is assured.

A further object of the invention is to provide a printing press and cutting means of the type described having novel scrap removal means to assure clean separation between the sheets and the scrap and to further assure that the severed scrap is removed to a position clear of the apparatus, and thus is not premitted to foul or clog the apparatus, or otherwise interfere with subsequent manufacturing steps.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, reference is made to the accompanying drawings, forming a part hereof, in which:

FIGURE 1 is a side elevational view of portion of a printing press and cutter device in accordance with the invention;

FIGURE 2 is a fragmentary plan view of the device of FIGURE 1;

FIGURE 3 is a section taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a magnified section taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a magnified fragmentary vertical section taken on the line 5—5 of FIGURE 2;

FIGURE 6 is a fragmentary plan view of a portion of the device;

FIGURE 7 is a magnified section taken on the line 7—7 of FIGURE 6;

FIGURE 8 is a magnified vertical section taken on the line 8—8 of FIGURE 6.

The invention herein is illustrated in conjunction with a conventional printing press, said press including the usual frame 10, having supported thereon, inter alia, an impression cylinder 11, a delivery cylinder 12, the axis of rotation of each of which is horizontally disposed in the usual manner. The operation of the press is in all respects conventional and well understood, and will be described only insofar as is germane to an understanding of the improvements hereof.

To the frame 10, which includes spaced parallel frame elements 13, 14, there is mounted a cutter support assembly bar 15. The assembly 15, which is horizontally disposed, is rendered laterally adjustable between the members 13, 14 by any suitable means, such as a threaded stub shaft 16 passing through the frame element 13 and through a support bracket 17, welded or otherwise affixed to said frame element. An adjustment handle 18 includes a boss 19, rotatably mounted to bracket 17, it being understood that the boss 19 is fixed against lateral movement with respect to bracket 17. The boss 19 is internally threaded over the portion 16 and it will be readily recognized that upon rotation in either direction of the handle 18, the entire support bar assembly will be shifted laterally with respect to the frame 10. Frictional or positive locking means may be provided between the bracket 17 and the boss 19 to prevent accidentally shifting the cutter assembly bar 15.

The end 20 of the cutter assembly bar 15 is keyed non-rotatably but slidably to the frame element 14. For this purpose, the end 20 may be squared, as shown, and may be sleeved within a complemental squared aperture formed in element 14, it being understood that any suitable means permitting sliding movement of the cutter assembly bar 15 but retarding relative rotation between the assembly bar 15 and the frame may be substituted.

4

It will be understood that the impression cylinder 11 is provided in the usual manner with an image forming surface which is periodically inked. Sheets stacked on a feed board (not shown) are delivered in the usual manner to the grippers 21, FIGURE 5, which grippers are keyed to a cam actuated rocker shaft 22 disposed within a hollowed portion of the impression cylinder 11. In the usual manner, the gripped sheets are carried between the impression cylinder 11 and a rubber cylinder 23, thereby imprinting the sheets, the same being thereafter carried to the delivery cylinder 12. The delivery cylinder is similarly provided with grippers which engage the sheets as the same are released by the grippers 21 of the impression cylinder, the delivery cylinder thus carrying the printed sheets to a delivery area. The gripper assembly is in all respects conventional and its operation is well understood by those skilled in the art.

The impression cylinder 11 is provided with a series of circumferential bands 24, which bands are preferably formed of thin gauge spring steel in the order of thickness of about .0012". The bands are preferably secured about the impression cylinder by means of a clamp assembly 25, see FIGURE 5, which assembly optionally may be supported on the rocker shaft 22. It will be understood that the clamp assembly 25 is rotatably mounted on said shaft and does not articulate with the shaft. The clamp assembly 25 includes band locking portions 26, 27, within which the opposite extremities 24a, 24b of the bands 24 are received. It will be recognized that other clamp means may be employed to accomplish this purpose, and the included expedient is illustrative only.

It will similarly be recognized that the bands 24, three of which are shown in FIGURE 2, may be adjusted laterally along the shaft 22 and may be locked by any suitable mechanism, such as by pairs of spacer collars (not shown), clamped to shaft 22 at any laterally adjusted position along said shaft.

As will be more fully understood from the ensuing description, the centermost band 24' will, for normal operation, be adjusted to underlie the longitudinal center line of sheets to be processed, the outer or marginal bands 24, 24 being adjusted to underlie the marginal portions of such sheets. It will, however, be recognized that the bands may be positioned in any desired manner or number to suit the specific conditions of sheet size, desired number of slittings, etc.

Supported on the cutter support bar assembly 15 are a plurality of spaced cutter knife members 30, as best seen in FIGURE 1. The knife assemblies 30 are laterally adjustably supported on, and non-rotatably keyed to, the cutter support bar assembly 15 by any suitable adjustment means, such as the split block portion 31. The block portion 31 includes a keying spline 32, entering a keyway slot 33 formed in the cutter bar support assembly 15, the split portions of the block 31 being mounted in tight engagement against the bar 15 by bolts or the like (not shown), threaded between the halves or portions of the block.

The cutter assembly 30 is likewise of conventional construction and includes a yoke 34, to which yoke there is pivotally affixed a cutter arm 35, carrying at its outer end 36 a rotatably mounted cutter knife blade 37. The arm 35 is biased toward impression cylinder 11 by a spring 38 sleeved over threaded shaft 39. End 40 of the shaft 39 is pivotally connected to the arm 35, the opposite end of the spring being biased, respectively, against tension control nut 41 carried by the shaft and a spring seat 42 formed on the yoke 34. It will be readily recognized that by threading the nut 41 toward or away from the seat 42, the tension with which the knife 37 will be urged toward the impression cylinder 11 may be adjusted. The throw or movement of the knife 37 toward impression cylinder 11 is controlled by a limit nut 43 which is threaded over shaft 39. The shaft 39 extends through a hollowed portion in the yoke 34, it being understood that

5

the leading or forward portion 44 of nut 43 will engage against the shoulder 45 of the yoke and will thus limit the movement of the knife 37 toward the impression cylinder 11, depending upon the adjusted position of the nut 43 along the shaft 39. Locking means, such as a knurled nut 46, maintains the nut 43 in the desired adjusted position.

Three identical cutter assemblies are shown in FIGURE 2, the center one, for convenience, being denominated 30a. It will be recognized that the position of the cutter assemblies 30, 30a, 30 along the shaft 15 will depend upon the width of the sheets to be processed, as will the positioning of the bands 24, 24', 24. It will similarly be noted that once the spacing of cutters 30 from the central cutter 30a is fixed, the three cutters may be adjusted laterally as a unit through the use of the adjustment handle 18, which serves to move the entire cutter bar support assembly 15 as a unit.

Further mounted to the cutter bar support assembly 15 are a series of hold down roller assemblies 50, FIGURE 3. The roller assemblies are adjustable longitudinally along but non-rotatably mounted on said cutter bar support assembly 15 by clamp blocks 51, 52, which may be bolted together at any desired position by bolts (not shown), the block 51 including a spline 53 which enters the keyway slot 33 in the cutter support bar assembly 15. The hold down roller assemblies 50 include a hold down arm 54, centrally supported at 55 on an extension 56 of the block portion 51. A spring 57 is biased between the block 51 and the upper section 58 of the arm 54, said spring tending to urge the roller 59, rotatably carried on the end 60 of the arm 54, toward the impression cylinder 11. A threaded stud 61, extending upwardly from the block portion 51, passes through an aperture (not shown) in the upper arm section 58. A nut 62, threaded on the stud 61, bears against the end 58 of the arm 54, thereby limiting the upward pivotal movement of the end 58 of the arm and concomitantly determining the approach position of the roller 59 as respects the impression cylinder 11.

As best seen in FIGURE 1, the roller 59, in the operative condition of the device, engages against a sheet being processed in the device at a leading position with respect to the cutter knives, i.e. slightly in advance of the position at which the sheet would be engaged between the cutter knives 37 and the anvil or bands 24, 24', 24.

It will thus be seen that as the sheets are imprinted and pass beneath hold down rollers 59, the same are immediately thereafter slit by passing between the cutter knives 37 and bands 24. It will be recognized that the cut edges formed by the action of the cutter knives 37 will be parallel to each other and will be precisely located with respect to the matter printed upon the sheets. Notwithstanding the high speeds at which the cylinders operate, i.e. in excess of six hundred feet per minute, no significant divergence of the lines of cutting is experienced in the use of the device, in contrast to attempts heretofore made to provide marginal slits during the printing operation of sheets. The parallelism of the slits formed, notwithstanding the same are adjacent the margins of the sheets, is attributed in part to the use of hold down rollers 59 in leading position as respects the cutter knives 37. Without limitation thereto, it is believed that past failures to provide successful parallel marginal sheet slitting devices is due to the fact that inherent in sheet printing operations, particularly where relatively heavy cardboard sheets are processed, the centrifugal force, when imposed upon the sheets, induces the central portion of said sheets to leave the surface of the impression cylinder. The effect of centrifugal force is more pronounced toward the end or last portion of the sheet to be slit. Moreover, the tendency toward separation between the sheets and the surface of the cylinder is increased by the provision of cutter knives having generally wedge-shaped cutting actions, such wedge-shaped actions tending to urge

6

the portions of the sheet to each side of the cutting line away from the cutter knives, and thus inducing a slack condition between the knives.

Without limitation, it is believed that the utilization of a plurality of hold down rollers located at a slight leading position as respects the cutter knives, together with the engagement of said rollers against the sheets at a point closer to the axis of rotation than the point of engagement of the cutter knives against the anvils or bands 24 also contributes to the success of the device in forming parallel slits.

It will be recognized that as a result of the preceding operations, narrow marginal strips or edge portions of the sheets will become separated from the mass of the sheets and the ensuing description relates to means for removing said strips so that the same do not become entangled within the chain drive device of the printing press (not shown) or otherwise become fouled in the printing apparatus.

The strip removal apparatus comprises a lead-in chute assembly 100 and a strip removal carrier assembly 101. The chute assembly includes a chute 102 having an entrance or guide lip 103 disposed in close adjacency to the area of contact of the two outermost cutter knives 37 and the outer anvils or bands 24. The removal assemblies which are associated with knives 30, 30a are in all respects identical, and consequently the description of one will suffice.

The lip 103 is located in the area between the impression cylinder 11 and a line tangent to the periphery of the band 24 at the point where the band engages the cutter knife 37. It will be recognized that by locating the lip 103 in the manner set forth, advantage is taken of the tendency of strip S, which is severed from the main sheet, to uncurl or straighten from the curved position assumed when the sheet is forced to conform with the outline of the cylinder 11. More specifically, the strip S which is caused in the printing process to follow the periphery of the impression cylinder 11, by reason of its natural resilience, will tend to spring away from the periphery and the leading edge of the strip beyond the knife 37 will normally tend to pass over the lip 103 and into the chute 102. Optionally and preferably, the leading edge of the strip is guided into the chute by an air jet developed by compressed air forced through an air guide device 104.

The air guide device 104 is oriented to direct the air jet laterally outwardly and radially away from the surface of the impression cylinder 11. The air direction above noted will function to aid in eading the end of the strip S over the lip 103 and will, at the same time, avoid any dispersion of the ink remaining on the impression cylinder 11.

It has been determined, for optimum efficiency in removing the strips, that it is important that the strip removing means mechanically shift the strips at a speed which somewhat exceeds the linear speed of movement of the strip while the same is carried about the impression cylinder 11. It has also been found that efficient removal of the strips is best accomplished if the strips are not torn. It will be readily understood that a transfer of the strips to a more rapidly moving strip removal means might ordinarily be expected to induce a tearing of the strips. The removal means hereinafter described has been found substantially free from any tendency to tear the strips.

The removal apparatus 101 comprises a guideway 105 which extends angularly as respects the frame element 13. The guideway includes opposed parallel wall portions 106, 107. Disposed within and forming a floor for the guideway 105 is an endless belt member 108 comprising a broad band of material, such as rubber or the like, having a relatively high coefficient of friction. The belt 108 is driven at a linear speed exceeding the speed of the impression cylinder by a motor 109 having a pulley 110 connected to a pulley 111 by a further belt 112.

The pulley 111 is, in turn, fixed to a drive roller 113, over which the belt 108 passes. Beneath the belt, between the flights thereof, are disposed a series of support idler rollers 114, the upper surfaces of which engage against the undersurface of the belt 108 and support the same substantially in a horizontal plane.

Wall assemblies 106, 107 are provided with a series of vertical slots or grooves 106a, 107a, within which slots or grooves are disposed stub shafts 115, 115, extending beyond the ends of top idler rollers 116. The idler rollers 16 preferably include spaced annular shoulder portions 117, 117, and a central cylindrical portion 118, the shoulders 117 being of slightly greater diameter than the portion 118 and lying, under the weight of the rollers themselves, against the upper surface of the belt. A spring pressed tension roller 119 is urged against the underflight of the belt by springs 120, 120 and maintains the desired degree of tension in the belt.

The assembly is completed by the provision of a plurality of cap members 121, preferably having handle portions 122 thereon for facilitating removal. The cap members 121 lie in the space between the adjacent top rollers 116, the trailing portions 123 of the cap members being directed downwardly or toward the belt 108. The cap members are supported between the walls 106, 107 in a manner so that the same are maintained by their weight in a position closely adjacent to the belt 108 but yet not touching the surface of the same. The forward-most cap portion 121a additionally includes a leading deflector portion 124 adjacent the exit of chute 102, said deflector serving to facilitate entry of the strip ends into the guideway 105.

The operation of the device will be readily understood from the foregoing description. Sheets carried by a feed board or the like are serially fed to a position where they may be engaged by gripper fingers 21 of the impression cylinder 11 and, in the usual manner, are guided between the impression cylinder and rubber cylinder 23, causing the same to be imprinted with any desired image. At the conclusion of printing, the marginal edges of the sheets outwardly of the line of contact between the knives 37 and bands 24 are cleanly severed from the sheets, the sheets being maintained against the surface of the impression cylinder by the hold down rollers 59. As the leading edges of the strips S just severed from the margins of the sheets pass the contact area between the knives and the bands, the same uncurl and under the uncurling influence and the optional additional influence of air supplied through the air jet 104, the strips are led over the entrance lip 103 of the chute assembly 100. The strips are led by the chute into a guideway 105, the floor portion of which is defined by a belt 108 moving in the direction of the arrows, FIGURE 8.

The belt 108 moves angularly outward as respects the direction of movement of the strips S and as the strips engage the belt, they are deflected angularly generally along the path of movement of the belt. As the strips continue to be shifted rearwardly, they are engaged between the portions 118 of idler rolls 116 and the belt, and are rapidly shifted outwardly from the device. It has been determined that notwithstanding the accelerated movement imparted to the strips, a tendency for the strips to be torn during such acceleration is minimized by the provision, first, of an angularly directed belt and, second, by the partial acceleration of the strip ends induced by the preliminary contact between such ends and the belt 108 before the same are positively driven by passing between the belt and the idler rollers.

It will be noted that preferably the speed of the belt is such that the strips are ejected with considerable rapidity from the outer end of the guideway 105, at which point may be located any suitable waste container.

The freely floating idler rollers 116 are self-clearing, i.e. should several layers of the scrap material accumulate at some position within the guideway, the same will serve

to attenuate the pressure applied to the strips by raising the rollers to reduce the direct pressure of the rollers on the belt and increase the force with which the rollers bear against the scrap, whereby the scrap is more tightly compressed between the rollers and the belt.

Preferably the positioning of the first idler roller 116a is such that the leading edge of each strip is compressed between said idler roller and the belt before the strip is completely severed from the sheet. It should be noted that the support idler rollers 114 are preferably disposed directly beneath the upper idler rollers 116 to assure a sufficient compression of the strips between the top rollers 116 and the top flight of the belt.

The free floating action of the cap members 121 aids in the continuity of service of the device by minimizing the likelihood of the occurrence of jams within the device, by accommodating plural layers of scrap without requiring shut downs to effect clearance.

It will be understood that the embodiment of the invention herein described is for illustrative purposes only, and that the same may be varied in form without departing from the spirit of the invention.

While the present invention is illustrated in conjunction with a standard printing press, it should be noted that it is useful in connection with other forms of printing, embossing or like devices where registration is required.

Likewise, the invention is not to be limited to the cutter or gripper devices as illustrated, but it will be readily recognized that the invention may be used in conjunction with a device having other cutters and other means for positively securing the sheet with respect to the cylinders.

While the illustrated apparatus employs bands adjustably fixed about the impression cylinder, it should be noted that substitutes for the bands, such as sleeves or an endless belt may be employed. Where a hardened impression cylinder is used, it may be possible, in certain instances, to dispense entirely with the bands.

Further, it has been found that where the sheets comprise lightweight paper, a suction system positioned beneath the cutter may be advantageously employed to lead away the scrap.

Having thus described the invention and illustrated its use, what is claimed as new and is desired to be secured by Letters Patent is:

1. In a high speed printing device or the like for handling paper and cardboard including an impression cylinder, a delivery cylinder, and gripper means for guiding and thereafter transferring discrete sheets from said impression to said delivery cylinder, a cutter assembly including cutter knife means carried by the frame of said press and yieldably biased toward said impression cylinder, annular anvil means carried by and extending radially beyond the periphery of said impression cylinder adjacent an end thereof, said anvil means being in engagement with said knife means, hold down means yieldably biased toward said impression cylinder and maintained in proximate spaced relation thereto, said hold down means including contact portions disposed closer to the axis of rotation of said impression cylinder than the point of engagement of said knife means and anvil means, said hold down means being in immediate leading position with respect to the point of engagement of said cutter knife and anvil, and waste removal means carried by said frame and positioned laterally outwardly with respect to said cutter knife to receive scrap portions of said sheets, said waste removal means being laterally angularly oriented with respect to the axis of rotation of said impression cylinder and including scrap removal means operating at a linear speed in excess of the linear speed of said impression cylinder, said scrap removal means including a conveyor belt, and an idler roller yieldably urged against said belt, the severed scrap portions being guided between said belt and roller.

2. In a sheet printing press or the like having a frame, an impression cylinder and delivery cylinder mounted for rotation on said frame, gripper means on said cylinders for holding and transferring sheets from one said cylinder to the other, and a sheet trimmer means including a knife operating against an anvil fixed to and extending beyond the periphery of said impression cylinder for severing a relatively thin marginal scrap edge portion from said sheet, a scrap removal means comprising a chute having an entrance lip adjacent the periphery of said impression cylinder in trailing position with respect to said knife, said lip being disposed between said impression cylinder and a line tangent to said anvil at the point of contact of said anvil and said knife, an extended guideway communicating with said chute, said guideway having a floor portion defined by an endless belt driven at a linear speed in excess of the linear speed of said impression cylinder, said floor being angularly oriented with respect to a plane normal to the axis of rotation of said cylinder, said guideway including at least one idler roller adjacent the entrance of said guideway and disposed above said floor portion and having its axis of rotation parallel with the plane of said belt and having a peripheral portion contacting said belt, said roller being yieldably urged against said belt and having its axis movable away from said belt.

3. A printing press in accordance with claim 2 wherein there are provided a plurality of longitudinally spaced apart idler rollers and said guideway includes vertically shiftable top plate portions defining a roof for said guideway, said portions being supported in proximate spaced relation to said belt, said top plate portions including deflector portions directed downwardly toward said belt, said deflector portions being disposed in proximate leading position with respect to said idler rollers.

4. A printing press in accordance with claim 2 wherein said idler roller is of generally cylindrical conformation and includes laterally spaced apart annular shoulders extending radially beyond the major body portion of said roller, whereby said shoulders engage said belt and the major portion of the periphery of said roller is spaced from said belt.

5. A printing press in accordance with claim 4 wherein said shoulders are of a thickness about equal to the thickness of the sheets to be processed.

6. A printing press in accordance with claim 2 and including means for projecting an air jet, said means being positioned adjacent said lip of said chute and being oriented to guide a stream of air outwardly away from the periphery of said impression cylinder and toward said lip, thereby to uncurl said scrap edge portion and urge the same laterally away from the main body portion of said sheet.

7. In a printing press or the like having an impression cylinder, a delivery cylinder and gripper means for guiding and thereafter transferring discrete sheets sequentially from said impression to said delivery cylinder, a cutter assembly for accurately, longitudinally dividing a single sheet into two identical sheets comprising three annular band members adjustably fixed to and extending beyond the periphery of said impression cylinder, two of said bands being disposed, respectively, adjacent the opposite ends of said impression cylinder and being spaced apart to be beneath the opposite marginal edge portions of

said sheets, said third band member being centered between said two bands, rotary cutter knife members supported on the frame of said press and yieldably urged against the outer periphery of said bands, the outer two said knives being equally spaced from the center knife, a plurality of laterally spaced apart hold down rollers yieldably urged toward the periphery of said impression cylinder and maintained in proximate spaced relation thereto, said rollers being disposed in immediate leading position across said cylinder with respect to said cutter knives, at least one said hold down roller being disposed in inward close adjacency to said outermost bands, the periphery of said roller being closer to the surface of said impression cylinder than the outer periphery of said band a pair of chute members mounted on said frame for the receipt of the severed scrap edges of said sheets, said chute members including entrance lip portions located, respectively, in proximate spaced relation to the points of contact of said knives with said outermost bands, said lips of said chutes being disposed between said impression cylinder and a line tangent to said outermost bands at the point of contact of said bands and said knives whereby the uncurling tendency of the leading edge of a severed strip will tend to lift said edge away from said cylinder and over said lip.

8. In a sheet printing press or the like having a frame, an impression cylinder and delivery cylinder mounted for rotation on said frame, gripper means on said cylinders for holding and transferring sheets from one said cylinder to the other, and a sheet trimmer means including a knife operating against an anvil on the periphery of said impression cylinder for severing a relatively thin marginal scrap edge portion from said sheet, scrap removal means comprising a chute having an entrance lip adjacent the periphery of said impression cylinder in trailing position with respect to said knife, said lip being disposed between said impression cylinder and a line tangent to said anvil at the point of contact of said anvil and said knife, an extended guideway communicating with said chute, said guideway having a floor portion defined by the upper surface of an endless belt driven at a linear speed in excess of the linear speed of said impression cylinder, said floor being angularly oriented with respect to a plane normal to the axis of rotation of said cylinder, said guideway including at least one idler roller having its axis of rotation parallel with the plane of said belt and having a lower peripheral portion contacting said upper surface of said belt and a central portion spaced from said belt.

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