May 6, 1969 B. B. PASQUINELLI 3,442,506

ANTISMUDGE SHEET TRANSFER DEVICE

Filed June 30, 1967

FIG. 1

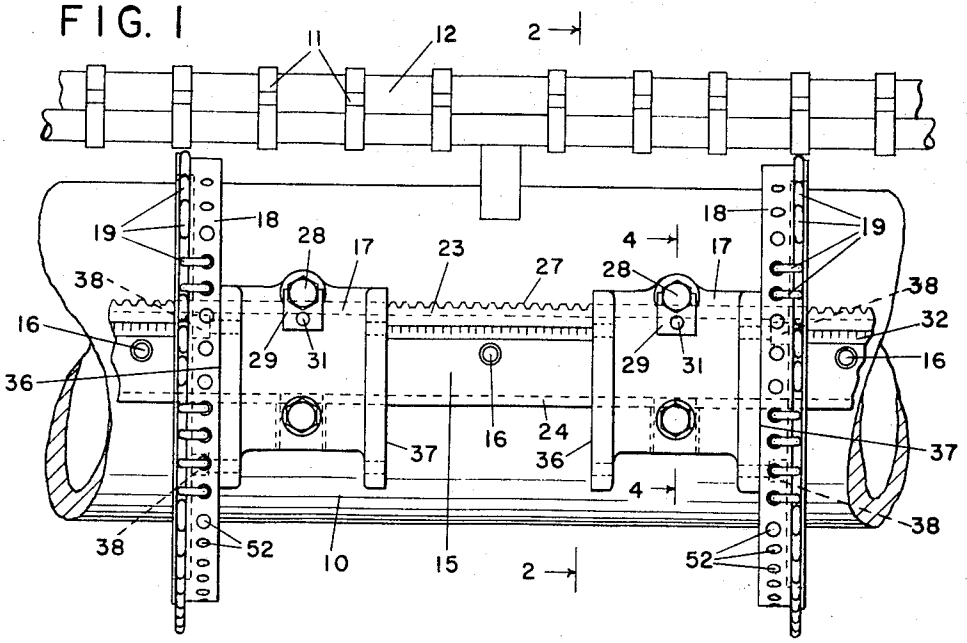


FIG. 2

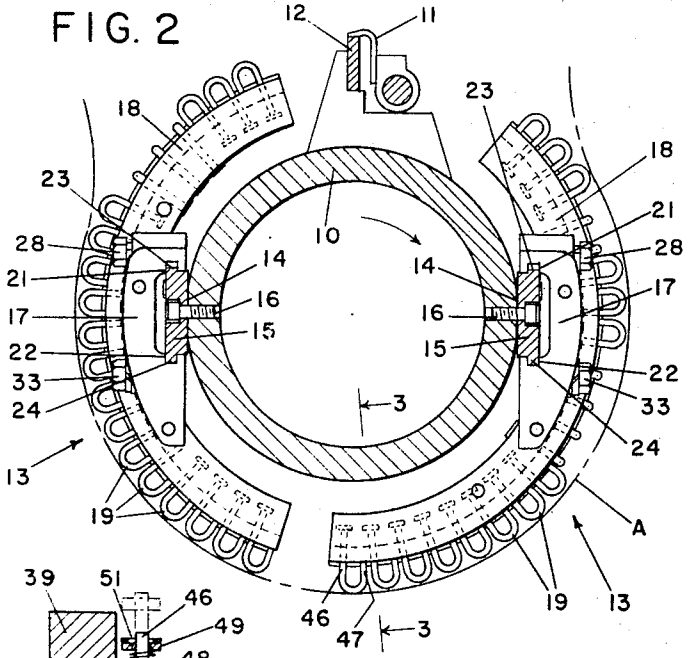


FIG. 3

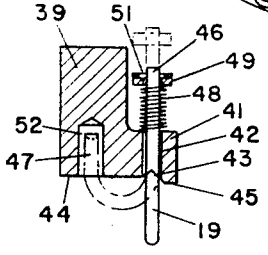
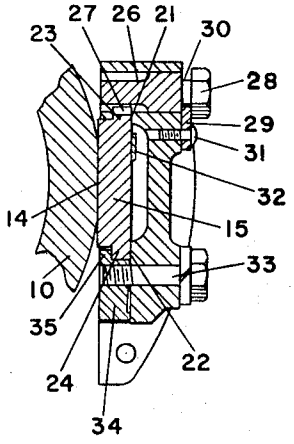


FIG. 4



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ANTISMUDGE SHEET TRANSFER DEVICE

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U.S. Cl. 271—85 11 Claims

ABSTRACT OF THE DISCLOSURE

The sheet transfer device is composed of arcuate sectors supported for rotation about an axis disposed transverse to the path of the sheets. The sectors are in spaced parallel relation and they are laterally adjustable relative to the sheet path and each sector has a plurality of sheet supporting members thereon which are selectively positionable in a radial direction to provide support for the sheets only in non-image areas thereof.

The invention pertains primarily to multicolor unit type printing presses. It is directed more specifically to the provision of improved means for transferring sheets between succeeding units of such presses whereby contact with the printed portions of these sheets may be completely avoided.

In multicolor printing presses of the unit type, it is conventional practice to employ one or more transfer drums having grippers thereon for conveying sheets from the impression cylinder of one unit to the impression cylinder of the next succeeding unit. During such transfer, each sheet is conveyed in a reverse curvilinear path so that the freshly printed and still wet impression on the face of each sheet is brought into contact with the peripheral surface of the transfer drum. Consequently, some of the wet ink tends to offset onto the surface of the transfer drum and if there is any relative movement between the sheets and the drum at this time, the wet impressions on the sheets may become smudged. The situation is most critical in offset presses because the tacky ink used in the offset process tends to make the trailing portion of each sheet cling rather tenaciously to the blanket cylinder and it must be adequately supported by a transfer drum or other suitable means in order to strip it off the blanket cylinder and cause it to travel in the normal sheet path. The resultant tension on the sheet obviously causes the wet inked impression to be pressed into intimate contact with the transfer drum surface and this in turn aggravates the smudging problem.

To alleviate the smudging problem, various ideas have been proposed heretofore such as, for example, covering the surface of the transfer drum with coarse granules, or with a grated metal jacket or by mounting saw teeth or other types of bands about the periphery of the transfer drum at spaced intervals to thereby reduce the area of conact with the printed portion of the sheet. None of these systems, however, has proved to be successful. The points of the granules or the sharp points of the grated metal jackets, when clean, tend to produce scratches which are readily discernible in the finished prints. Furthermore, after a short period of operation, ink accumulates on the points and this in turn tends to smudge the impressions on subsequent sheets.

The saw teeth and other types of bands proposed heretofore also have been only partially effective for the purpose. They are generally limited to use on jobs wherein the images on the printing plate can be arranged to provide unprinted tracks or alley extending the full length of the sheets to accommodate the bands. In most instances, such continuous unprinted tracks cannot be provided due to the need for interlocking the various image areas to thereby conserve paper and, therefore, the bands must contact some printed areas of the sheet and some smudging can occur.

It is also known to provide transfer reels at spaced intervals across the width of the sheets and which have radially displaceable elements that are selectively positionable so as to engage and support the sheets only in non-image areas thereof. These latter devices, however, are intended primarily for transferring sheets from an impression cylinder to a delivery mechanism and, although they have met with limited success for this purpose, they are not suitable for transferring sheets between units. This is primarily due to the fact that they lack the flexibility necessary to provide adequate support for between-unit transfer of all types of printed sheets.

The present invention is directed to an improved sheet transfer device which obviates the disadvantages of the known systems. It essentially consists of a series of arcuate sectors which are mounted for lateral adjustment on a reduced diameter drum and each sector carries a series of selectively, radially positionable sheet engaging elements at spaced intervals about the periphery thereof. The sectors and elements are conveniently adjustable and suitable gage means are provided on the sectors and on the drum, which makes it possible to make ready the respective members from a proof of the sheets to be printed. The transfer device can therefore be made ready simultaneously with the respective printing units instead of after said units are made up, to thereby substantially reduce, if not completely eliminate, the extra make-ready time which has previously been required for this purpose.

It is a primary object of this invention, therefore, to provide an improved sheet transfer device having a series of sheet supporting elements thereon which can be conveniently positioned to provide maximum support for the sheets during their transfer while substantially avoiding any contact with the printed areas thereof.

Another object is to provide an improved sheet transfer device which incorporates suitable gage means whereby the sheet supporting elements can be made ready simultaneously with the printing units to thereby reduce, if not completely eliminate, the extra time previously required for this purpose.

Other objects and advantages will become apparent from the following description and accompanying drawings, wherein:

FIGURE 1 is an elevational view as seen from the right of FIGURE 2 and showing a portion of a sheet transfer device constructed in accordance with this invention;

FIGURE 2 is a sectional view in elevation, taken along line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged sectional view taken along line 3—3 of FIGURE 2; and

FIGURE 4 is an enlarged sectional view taken along line 4—4 of FIGURE 1.

With reference now to the drawings, a preferred embodiment of the sheet transfer device is illustrated as including a main supporting shaft or drum **10**, having a series of gripper fingers **11** and pads **12** mounted thereon and which are adapted to be actuated in a conventional manner so as to take succeeding sheets from the impression cylinder of one printing unit, convey them in a reverse curvilinear path as indicated by the broken line A in FIGURE 2, and then transfer them to the grippers on the next transfer drum or to the grippers on the impression cylinder of the next succeeding printing unit as is well known in the art.

Only a portion of the drum **10** is shown in FIGURE 1, but it will be understood that it extends across the full

width of the press with the journals thereof mounted for rotation in the respective press side frames and that it is gear-driven in timed relation with the adjacent cylinders.

As each sheet is conveyed about the axis of the drum **10**, the printed side thereof faces inwardly toward the drum, and to avoid contact between the wet, freshly printed image and the surface of the drum, the latter is formed with a substantially reduced radius and the body or trailing portion of each sheet is adapted to be supported at its normal radius by a series of reel type assemblies, indicated in their entirety by the numeral **13**. A series of these assemblies obviously will be arranged at spaced intervals along the drum to provide support for the sheet over its entire width, but since they are all identical, only one such assembly will be described in detail and similar reference numbers will be used to designate corresponding elements in the other assemblies.

In FIGURE 2, it will be seen that the drum **10** has two flat areas **14** formed at diametrically opposite points on its periphery which provide a base for two bars **15** that are secured to the drum, parallel to its axis, by means such as the bolts **16**. The bars **15** are coextensive with the drum and they are adapted to support one or more brackets **17**, each of which carries an arcuate section **18** having a series of sheet engaging elements **19** thereon for supporting the sheets. The brackets **17** are formed with channels **21** and **22** adapted to slidably fit over the flanges **23** and **24**, respectively, on the bars **15** and the brackets are arranged to be individually adjustable longitudinally along the bars by means of a pinion gear **26** carried by the bracket and which is adapted to mesh with rack teeth **27** formed along the top edge of the flange **23**. One end of the pinion gear extends beyond the bracket and is provided with a hexagonal head **28** to accommodate a wrench for adjustment purposes and it is secured against axial movement in the bracket by a retainer **29** which fits into the neck **30** in the gear and is fastened to the bracket by a bolt **31**. Accordingly, each bracket **17** and its associated assembly is individually adjustable along the drum **10** and its location can readily be determined by means of a calibrated scale **32** attached to the bar **15** and which is coextensive therewith.

Each bracket **17** also carries locking means in the form of a bolt **33** and a clamp member **34** for securing it against unintended movement along the bar **15** once its position has been established. The bolt **33** is inserted through an opening in the bracket and is threaded into the clamp member **34**, which is located in a recess provided on the opposite side of the bracket. The clamp member has a lip **35** formed thereon adapted to engage the side face of the flange **24** so that when the bolt **33** is tightened, the lip **35** is pressed tightly against the flange **24** to secure the bracket in its adjusted position. When the bolt is loosened, the clamping effect is relaxed and the bracket is released for adjustment purposes.

As stated hereinabove, each bracket is adapted to carry a sector **18**, which may be secured to either side face **36** or **37** of the bracket by bolts **38** in a manner that it is concentric with the drum **10**. The sector essentially consists of a body portion **39** having a laterally projecting flange **41** and a series of uniformly spaced, radially disposed holes **42** are formed in said flange **41** to accommodate a corresponding number of sheet engaging elements **19**. A groove **43** is formed in the peripheral surface **44** of the sector in alignment with the holes **42** and a flange **45** of slightly greater radius than the surface **44** is formed along one side of said groove for a purpose which will become evident hereinafter.

Each of the sheet engaging elements **19** is formed from round wire stock which is bent into a substantially U-shaped configuration, with one arm **46** thereof being substantially longer than the other arm **47**. The long arm is inserted through a hole **42** in the flange **41** and it is retained therein by a compression spring **48**, which is confined between the flange and a cup washer **49** that is held on the arm **46** by a pin **51**.

The spring **48** thus exerts a constant force on the sheet engaging element in a direction toward the axis of the drum **10** and it serves to retain said element in either its operative or inoperative position. In the operative position, the element is turned so that the end of the short arm **47** thereof is seated in the groove **43** on the flange **41**. In this location it maintains the element in a radially projected position wherein the outermost point of the element is coincident with the sheet path and will thereby support the sheet during its transfer. In the inoperative position, the element is turned approximately 90 degrees, at which point the short arm **47** is aligned with and is adapted to be received in a recess **52** provided in the surface **44** of the sector adjacent to each hole **42**, as indicated by the broken lines in FIGURE 3. The recess thus permits the element to be retracted well within the radius of the sheet path under the influence of the spring **48** to thereby avoid contact with a printed portion of the sheet.

The spring **48** is designed in such a manner that it not only exerts a constant biasing force to maintain the elements in the respective operative and inoperative positions, but it also acts as a positive stop to limt the radial outward movement of the element. In other words, when an element is manually moved radially outwardly for setting in the operative position, the spring will be fully compressed when the end of the arm **47** thereof clears the surface **44** of the sector. The element can then be pivoted to and from the operative position. However, when fully extended, the end of the arm **47** will not clear the projecting flange **45** on the sector **18**, which thus serves to limit the pivoting movement of the element and thereby facilitates setting the respective elements in the operative position.

Although the markings have not actually been shown in the drawings, for the sake of clarity, it is to be understood that the sheet engaging elements are consecutively numbered by indicia, which may be stamped or otherwise applied to the sector adjacent each hole **42** and which indicia bears a direct relation to the distance of each element from the gripper pads **12**. Accordingly, when the assembly is to be made ready, it is a simple matter for the pressman to determine which of the elements should be placed in the inoperative position in order to avoid contact with the printed areas of the sheet.

From the foregoing description, it will be obvious that the transfer device represents a relatively flexible means for transferring printed sheets without smudging and which is simple and convenient to make-ready. From a proof of the job to be printed, the pressman can readily determine the lateral positions of the unprinted tracks on the sheets between the images, and by means of the calibrated scale **32** on the bars **15**, it is a simple matter to set the assemblies **13** so as to coincide therewith. Also, where the unprinted tracks are interrupted by interlocking image areas, the distance thereof from the leading edge of the sheet can be measured, and by means of the indicia on the sectors, the sheet engaging elements which coincide with such image portions can be readily identified and set in their inoperative position. These settings can readily be made while the printing units are being prepared for another job so that the press will be ready to print as soon as make-ready of the printing units is completed.

In the embodiment of the transfer device as shown in FIGURE 2, it will be noted that the assemblies **13** on each side of the drum **10** are constructed as completely independent units which are separately adjustable along the drum. This arrangement is preferred because it provides additional flexibility whereby the respective assemblies can be offset relative to one another to compensate for small offsets in the unprinted tracks in the sheets which seldom are continuous throughout the length of the sheets. However, it is obvious that the two sectors **18** could be replaced by a single sector, which would be

supported as a single unit comprising two brackets **17**. In such case, however, only one bracket would be provided with a pinion gear for adjustment puposes and the other bracket would simply slide therewith on its supporting bar **15**.

It is obvious that other modifications in the configuration and arrangement of the various elements will become apparent to persons skilled in the art without departing from the spirit of the invention and it is intended to cover all such modifications which will come within the scope of the appended claims.

What is claimed is:

1. A sheet transfer device for transferring sheets between units of a printing press comprising a rotatable drum, gripper means on said drum for engaging the leading edge of a sheet and conveying it in a reverse curvilinear path having a radius greater than that of said drum from a cylinder of one unit to the next adjacent cylinder whereby the wet, freshly printed side of the sheet faces inwardly toward the drum, an arcuate sector, a series of aligned sheet engaging elements mounted at spaced intervals about the periphery of said sector, said elements being selectively positionable between an inoperative position wherein they are withdrawn from the sheet path and an operative position wherein they are coincident with the sheet path, means including an elongated member extending parallel to the axis of the drum for mounting said sector for rotation with said drum, and adjustable means including a rotatable member associated with said sector for adjusting the sector along said elongated member longitudinally of said drum.

2. A sheet transfer device as set forth in claim **1**, wherein the arcuate sector comprises a curved body portion and a laterally projecting flange formed on said body portion, and wherein a series of uniformly spaced, radially disposed openings are formed in said flange, said sheet engaging elements being slidably mounted in said openings.

3. A sheet transfer device as set forth in claim **2**, wherein the sheet engaging elements each comprise a substantially U-shaped member, one arm of each said member being slidably mounted in an opening in said flange for radial and pivotal movement therein, a retainer secured to the end of said one arm, and a spring mounted on said arm between the retainer and said flange for biasing said member toward its inoperative position.

4. A sheet transfer device as set forth in claim **3**, wherein the arcuate sector is provided with a recess adjacent each said opening, each said recess being adapted

to receive the other arm of an element when the latter is moved to its inoperative position.

5. A sheet transfer device as set forth in claim **3**, wherein the arcuate sector has a groove formed about its periphery in alignment with said openings, said groove being adapted to receive the said other arm of each element when the latter is moved to its operative position, and a radially projecting flange formed on the periphery of the arcuate sector adjacent said groove, said flange having coaction with the other arm of each element to prevent movement of said element beyond the operative position.

6. A sheet transfer device as set forth in claim **1**, wherein the moutning means for the arcuate sector includes a bar mounted on said drum and extending across the path of the sheets, a bracket moutned on said bar, said sector being mounted on said bracket, and additionally including means for adjusting said bracket laterally along said bar.

7. A sheet transfer device as set forth in claim **6**, wherein the adjusting means for said bracket includes a rack formed along one edge of said bar, a coacting pinion rotatably mounted in said bracket, and means for rotating said pinion to thereby adjust said bracket along said bar.

8. A sheet transfer device as set forth in claim **6**, additionally including locking means for securing said bracket in its adjusted position on said bar.

9. A sheet transfer device as set forth in claim **8**, wherein the locking means comprises a clamp member carried by said bracket, a lip formed on said clamp member, and means for pressing said lip against said bar to restrain the bracket against lateral movement.

10. A sheet transfer device as set forth in claim **6**, additionally including a scale mounted on and coextensive with said bar to facilitate setting said bracket in a predetermined position along said bar.

11. A sheet transfer device as set forth in claim **2**, wherein each of said openings is numbered with relation to its distance from the grippers to facilitate the setting of predetermined sheet engaging elements into their operative position.

References Cited

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RICHARD E. AEGERTER, *Primary Examiner.*

U.S. Cl. X.R.

101—420

U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,442,506 May 6, 1969

Bruno B. Pasquinelli

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, lines 57 and 58, "conact" should read -- contact --. Column 2, line 40, after "device" insert -- incorporating means for effecting rapid and accurate adjustments of the sheet supporting assemblies.

It is a further object to provide a sheet transfer device --; Column 4, line 24, "limt" should read -- limit --. Column 6, line 16, "moutning" should read -- mounted --.

Signed and sealed this 14th day of April 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents