# United States Patent

**Papa et al.**

[15] **3,643,598**

[45] **Feb. 22, 1972**


## [54] SHEET TRANSFER ROLLER FOR USE IN MULTICOLOR ROTARY PRINTING PRESSES


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[73] Assignee: **Societa' Nebiolo S.p.A.,** Turin, Italy



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[30] **Foreign Application Priority Data**

Nov. 6, 1969 Italy ..... 50258

[52] **U.S. Cl.** ..... **101/420,** 271/51

[51] **Int. Cl.** ..... **B411 41/06**

[58] **Field of Search** ..... 101/416, 420, 415.7; 29/124; 271/51, 85



[56] **References Cited**

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*Attorney*—Sughrue, Rothwell, Mion, Zinn & Macpeak



[57] **ABSTRACT**

A sheet transfer roller for use in multicolor printing presses is formed by a number of sets of arcuate elements arranged concentrically with the roller axis and slidably mounted on respective guides carried by the roller and extending parallel to the roller axis. The arcuate element can be clamped to the guides at the desired positions by clamping screws. It can be arranged that sheet supporting members carried by the arcuate elements engage a sheet to be transferred at selected relatively print-free regions.


**4 Claims, 7 Drawing Figures**

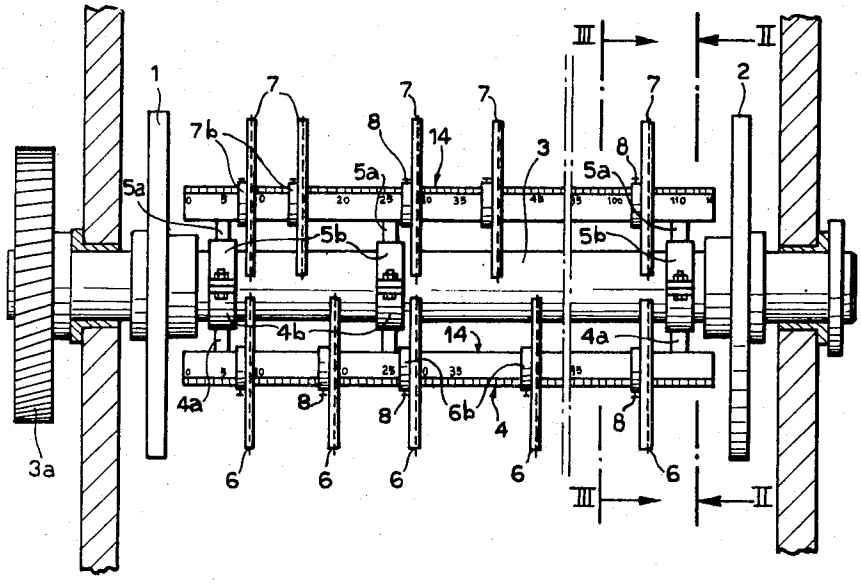


Fig.1

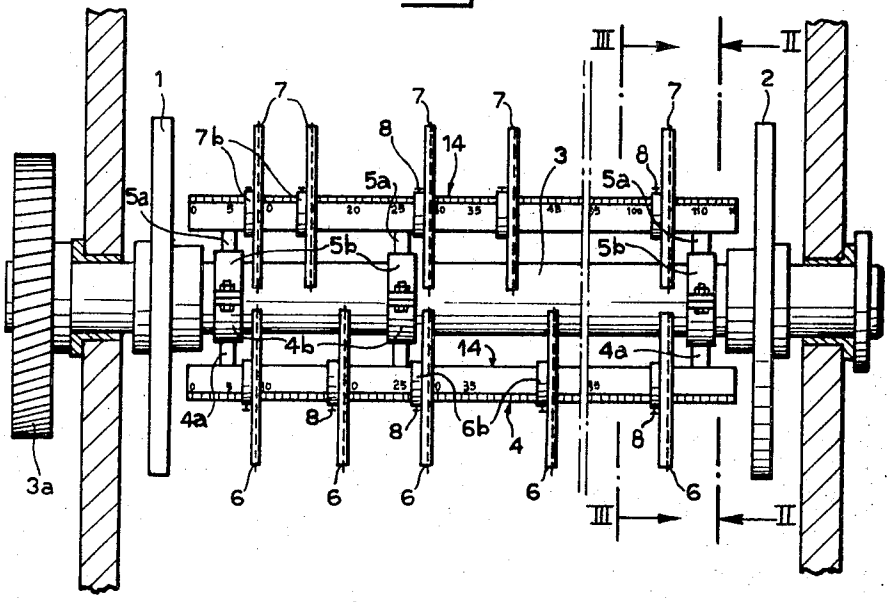



Fig.7

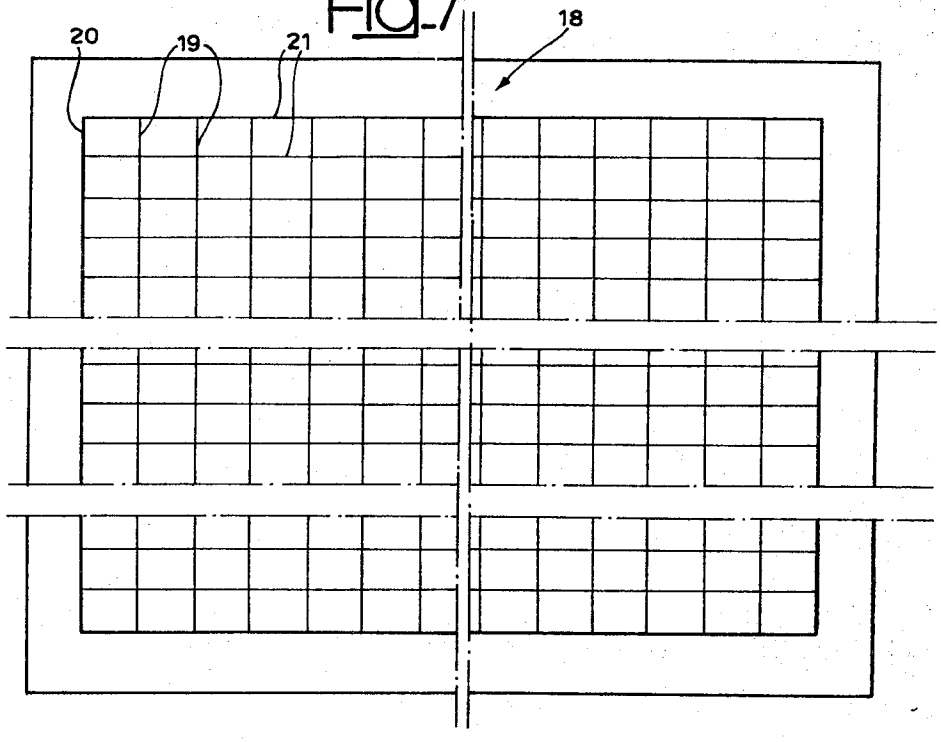


Fig. 2

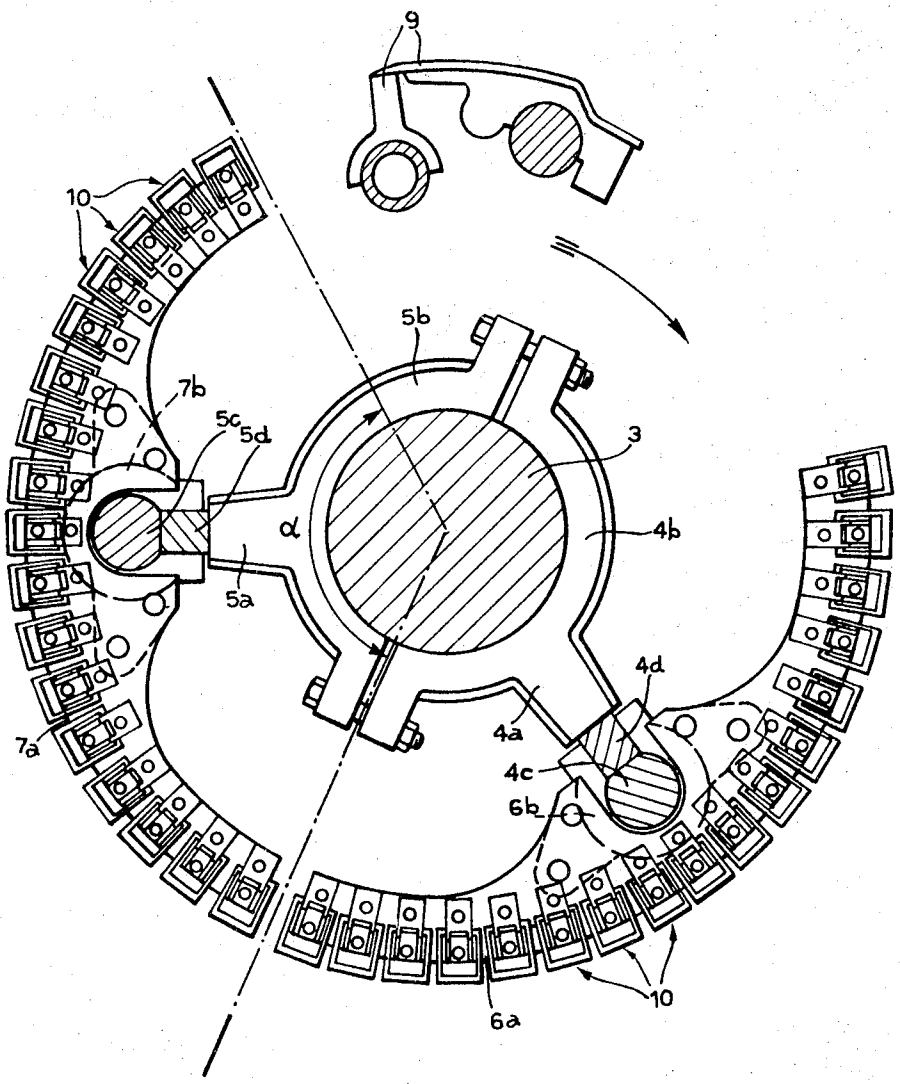


Fig-3

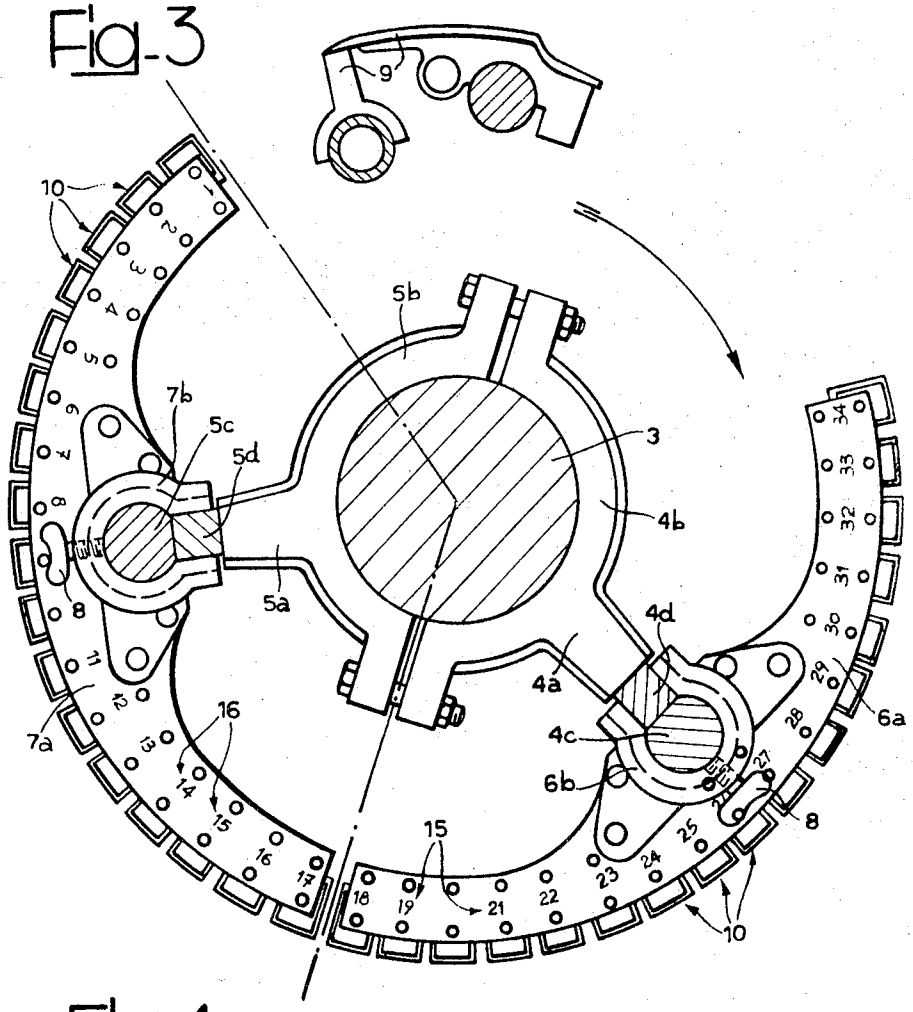



Fig-4

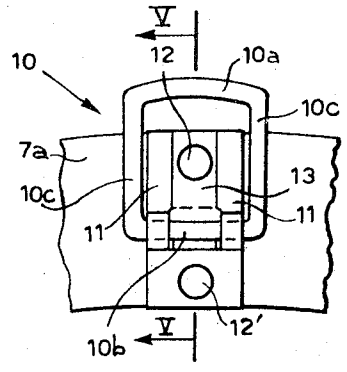
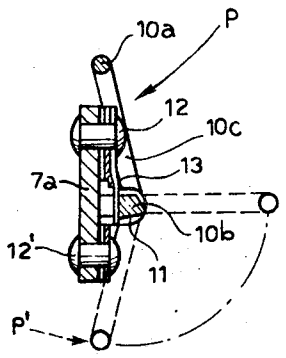



Fig-5



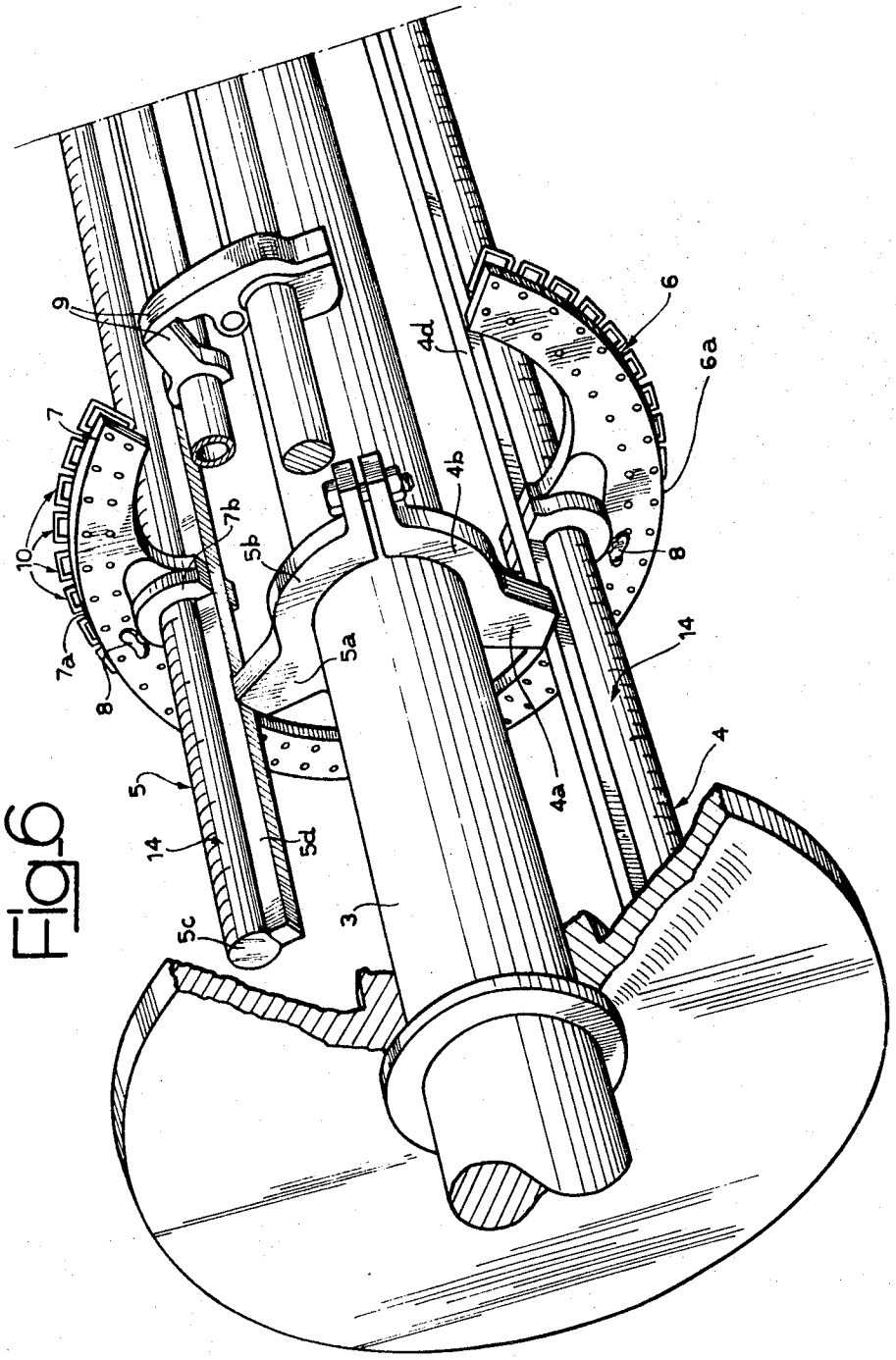



Fig 6

# SHEET TRANSFER ROLLER FOR USE IN MULTICOLOR ROTARY PRINTING PRESSES

This invention relates to sheet transfer rollers, particularly for use in multicolor rotary printing presses.

Known arrangements for transferring sheets between two printing elements in multicolor printing presses comprise a certain number of intermediate transfer rollers.

With such arrangements each sheet is withdrawn from the printing cylinder and is transferred by the transfer rollers to the next printing element of the printing press. During transfer the printed face of the sheet may be soiled and its quality impaired either because it comes into direct contact with the peripheral supporting surfaces of the transfer roller or because dry ink previously deposited on said supporting surfaces scratches the fresh print on the sheet.

In order to obviate these drawbacks it has been proposed to arrange concentrically on the shaft for each transfer roller a number of sectors providing the sheet supporting surfaces, means being provided for effecting axial displacement of the sectors.

Further known arrangements consist in providing the transfer rollers with arcuate strips made of metal, plastics, leather or other suitable material, which are displaceable parallel to the roller axis to positions in which they support regions of the sheet which are free from prints.

However, the above known arrangements are unsatisfactory where the sheet to be transferred has substantially no print-free regions extending throughout the length of the sheet.

In any case, placing the sheet supporting surfaces in such manner that they contact the sheets only at blank regions or part-printed regions of the sheets, requires a tedious and lengthy preparation of the transfer roller which is inconsistent with the need for economical operation of the printing press.

Still further known arrangements consist in coating the skirts of the transfer rollers with ink-repellent materials. In actual practice, however, not even the use of such materials will prevent ink from being deposited on the supporting surfaces of the rollers. The latter should therefore be washed frequently if damage to the printed sheets is to be prevented, and this also entails heavy losses of production time in the printing press.

It will be apparent, therefore, that none of the known arrangements solve satisfactorily either the problem of transferring printed sheets by transfer rollers, or the problem, which follows from the first-mentioned problem, of maintaining within reasonable limits the necessary time for preparing the printing press for printing a given pattern or form.

An object of the present invention is to substantially avoid, or minimize, these drawbacks by providing an improved sheet transfer roller for use particularly in multicolor rotary printing presses.

Accordingly the invention provides a sheet transfer roller, for use in multicolor rotary printing presses, for supporting a sheet during transfer of the latter between successive printing elements of the press, characterized by the improvement which consists in said roller including a plurality of sets of arcuate elements concentric with the roller axis, respective guides extending parallel to the axis of the roller, the arcuate elements associated with each respective set being slidably mounted on said guides, means supporting said guides from the roller, and means on said arcuate elements effective to hold said elements in position along their respective guides.

Each arcuate element is conveniently provided with sheet supporting means arranged adjacent the outer periphery of the element and secured thereto. Preferably the sheet supporting means are movably mounted on the respective arcuate elements so that each sheet supporting means can be disposed at will in either of two different positions, namely an inoperative position and an operative position, a sheet supporting part of the said supporting means being spaced further from the roller axis in the operative position of the supporting means than in the inoperative position thereof.



Each said sheet supporting means preferably comprises a substantially rectangular loop mounted in proximity to the outer periphery of one face of the respective arcuate element and capable of tilting laterally about one of its shorter sides extending substantially tangentially to the closest part of said outer periphery so as to cause the other shorter side, constituting the sheet supporting part, to be positioned at will either radially inwardly or radially outwardly of said outer periphery.

Further characteristic features and advantages of the invention will be understood from the following description, given by way of nonlimiting example, with reference to the accompanying drawings, wherein:

FIG. 1 is an elevational view of a transfer roller according to one embodiment of the invention;

FIGS. 2 and 3 are cross-sectional views on lines II—II and III—III respectively in FIG. 1;

FIG. 4 is a view on an enlarged scale of a constructional detail of the transfer roller shown in FIGS. 1 to 3;

FIG. 5 is a cross-sectional view on line V—V of FIG. 4;

FIG. 6 is a partly cut away perspective view of the transfer roller according to the invention; and

FIG. 7 shows a graduated transparent sheet for use in preparing the said transfer roller for operation.

The transfer roller shown on the drawings comprises a pair of end discs 1, 2 secured to a common rotary shaft 3. The shaft 3 is conveniently supported for rotation near its opposite ends in the frame, part only of which is shown in section, of one printing element of a multicolor rotary printing press.

The shaft 3 carries at one end a gear 3*a* by which it receives rotary drive from the drive transmission (not shown) of the printing press for imparting rotation to the shaft 3.

The shaft 3 supports two elongated guides 4, 5 which extend parallel with the axis of the shaft 3. The guides 4, 5 are in the form of similar beams equally spaced from the axis of the shaft 3. The guides 4, 5 are each maintained in their respective positions parallel with the axis of the shaft 3 by a plurality of respective semicircular crescent-shaped supports 4*b*, 5*b* frictionally secured to each other and thereby frictionally clamped to the shaft 3 by means of bolts and nuts (FIG. 2). Each support 4*b*, 5*b* has an integrally formed bearing arm 4*a*, 5*a* to which the respective guide 4, 5 is secured.

The guide 4 supports for axial sliding movement a plurality of similar arcuate segments 6 the periphery 6*a* of each of which is concentric with the axis of the shaft 3. In addition, the guide 5 has slidably mounted thereon segments 7 equal in number to the segments 6 and similar to the latter, having arcuate peripheries 7*a*. If desired, the number of segments and angular width of each segment 6, 7 slidably mounted on the respective guide 4, 5 could be different. Also, the segments 6, 7 could, alternatively, be replaced by other arcuate elements such as sectors. The mutual angular position of the guides 4 and 5 should in any case be such that the spacing of the outer peripheries 6*a* and 7*a* of the respective segments 6, 7 carried thereby is smallest when the segments are situated substantially in a common plane passing through the axis of the shaft 3.

In order to prevent rotation of the segments 6, 7 about their respective guides 4, 5, the latter are shaped with a keyhole cross section, including outer portions 4*c*, 5*c* respectively, of substantially circular cross section and inner portions 4*d*, 5*d*, respectively, of substantially rectangular cross section, connecting the portions 4*c*, 5*c* to the respective bearing arms 4*a*, 5*a*.

The segments 6, 7 are mounted on their respective guides 4, 5 through the interposition of respective lateral supports hubs 6*b*, 7*b*. Radial tapped holes are bored in the hubs 6*b*, 7*b* and receive clamping screws 8 which are easily accessible. By releasing the clamping screws 8 the segments 6, 7 can be positioned as desired on their respective guides 4, 5 and then secured in position by tightening the clamping screws.

Each segment 6, 7 is provided with a plurality of supporting means for supporting the sheets during their transfer, when the leading edges of the sheets are clamped to the transfer

roller by means of a pair of nippers **9**, shown diagrammatically, carried by the roller.

The supporting means are each in the form of a metal loop **10** which is substantially rectangular, having one short side **10***a* (FIG. 4) slightly convex outwardly and its other short side **10***b* of a quadrangular cross section in its middle portion (FIG. 5) the remainder of the loop **10** being of circular cross section. Each loop **10** is arranged with its axis of symmetry in a plane containing the axis of the shaft **3**. Each loop **10** carried by any one segment **6** or **7** can rotate about its side **10***b* by virtue of a hinge attachment comprising a pair of brackets **11** supporting opposite ends of the side **10***b* where the latter has a circular cross section. Each pair of brackets **11** is secured by radially outer and inner rivets **12** and **12'** to one face of the respective segment **6** or **7**.

The radially outer rivet **12** also retains a small leaf spring **13** (FIGS. 4 and 5) the free end of which bears against the middle portion of quadrangular cross section of the side **10***b* of the loop **10**.

With this arrangement, and by virtue of the position of the hinge axis of each loop **10** with respect to the outer periphery **6***a*, **7***a* of the respective segment **6**, **7**, each loop **10** can be tilted, simply by applying finger pressure, from a respective inoperative position denoted by P' (in broken outline) in FIG. **5** to an operative position denoted by P in the same figure. The spring **13** ensures that the loop **10** is resiliently retained in both its operative and inoperative positions P, P', and snaps between these positions. In both the positions P, P' the plane of the loop **10** is slightly inclined with respect to the face of the segment **6**, **7** to which it is attached. The force exerted by a sheet being transferred on the convex sides **10***a* of each loop **10** which projects radially outwardly from the periphery **6***a*, **7***a* of each segment **6**, **7** tends to maintain the loop **10** in its operative position P.

The guides **4**, **5** are provided with similar spaced apart transversely extending graduation lines **14** and the segments **6**, **7** have engraved thereon respective sets of angularly spaced apart numerals **15**, **16** respectively, coinciding with the positions of the respective loops **10**. The numerals in the set **16** are the continuation of the numerals in set **15**, both sets of numerals **15**, **16** being engraved in the segment faces opposite the faces carrying the hinge brackets **11** for the loops **10**.

The spacing of the graduation lines **14** on the guide **4**, **5** correspond with the spacing of longitudinal rulings **19** marked on a transparent sheet **18** (FIG. 7).

The said transparent sheet **18** further carries horizontal rulings **21**, each of which is distinguished by one of the numerals in the sets **15** or **16** engraved on the lateral faces of the segments **6** and **7**.

The sheet **18** assists in initially setting up the transfer roller with the segments **6**, **7** positioned along their respective guides **4**, **5** and in determining the loops **10** which should be moved to their operative positions when printing a given form or pattern on the sheets. This is effected by superposing the transparent sheet **18** on a printed standard sheet and determining the coordinates of the blank regions at which the sheets can be engaged by the loops **10** during transfer thereof by the transfer roller. By means of these coordinates the segments **6**, **7** can be positioned easily and accurately along their respective guides **4**, **5** and the selected loops **10** can be quickly moved to their operative positions.

It will be understood that, within the principle of the invention, constructional details of practical embodiments can be widely varied from those of the example described and shown without departing from the scope of the invention as defined by the appended claims.

What is claimed is:

1. For use in multicolor rotary printing presses a sheet transfer roller for supporting a sheet during transfer of said sheet between successive printing elements of the press comprising a plurality of sets of arcuate elements concentric with the roller axis, guide means for each of said sets of arcuate elements extending parallel to the axis of the roller with the arcuate elements associated with each set being slidably mounted on a respective guide means, means supporting said guide means on the roller, means on said arcuate elements for holding said elements in position on their respective guide means, sheet supporting means, means for pivotally securing a plurality of said sheet supporting means to one side of each of said arcuate elements along a curved line concentric with the roller axis and spaced inwardly from the outer periphery of said arcuate elements for selective movement between an inoperative position and an operative position, each of said sheet supporting means being comprised of a substantially rectangular loop having two longer sides and two shorter sides, one of said shorter sides being pivotally mounted on an arcuate element and the other of said shorter sides defining a sheet supporting part which extends beyond the periphery of said arcuate element in the operative position of said sheet supporting means and which is disposed radially inwardly of the outer periphery of said arcuate element in the inoperative position.

2. Roller as claimed in claim 1, wherein the sheet supporting shorter side of each sheet supporting loop is shaped with a slight outwardly convex curvature.

3. Roller as claimed in claim 1, wherein the shorter side about which each loop is pivoted has a region of quadrangular cross-sectional shape and further comprising a plurality of leaf springs secured to the respective arcuate elements with one end of each leaf spring bearing upon said quadrangular section region of each loop, whereby each loop snaps from its inoperative into its operative position and vice-versa.

4. Roller as claimed in claim 3, wherein each loop, at least when in its operative position, is inclined in the direction of the side of the arcuate element remote from the side to which it is pivoted.

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# UNITED STATES PATENT OFFICE

# CERTIFICATE OF CORRECTION

Patent No. 3,643,598 Dated February 22, 1972

Inventor(s) Paolo PAPA and Federico CAPETTI

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

In the Heading:

The Claim of Priority should read as follows:

--Foreign Application Priority Data

January 23, 1969 Italy . . . . . 50258-A/69--

Signed and sealed this 3rd day of October 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334