

[54] **DEVICE FOR WEBBING A ROTARY PRINTING PRESS**

[75] Inventors: **Hans-Bernhard Bolza-Schunemann**,
Wurzburg; **Heinrich Lichtblau**,
Karlstadt/Main, both of Germany

[73] Assignee: **Schnellpressenfabrik Koenig & Bauer Aktiengesellschaft**, Wurzburg, Germany

[22] Filed: **Jan. 26, 1971**

[21] Appl. No.: **109,898**

[30] **Foreign Application Priority Data**

Apr. 30, 1970 Germany..... P 20 21 246.8

[52] U.S. Cl. **226/92**, 101/181

[51] Int. Cl. **G03b 1/56**

[58] Field of Search..... 105/29; 226/92;
101/17 B, 181

[56] **References Cited**

UNITED STATES PATENTS

1,541,589	6/1925	Rossini.....	105/29
2,862,705	12/1958	Faerber.....	226/92

Primary Examiner—Allen N. Knowles

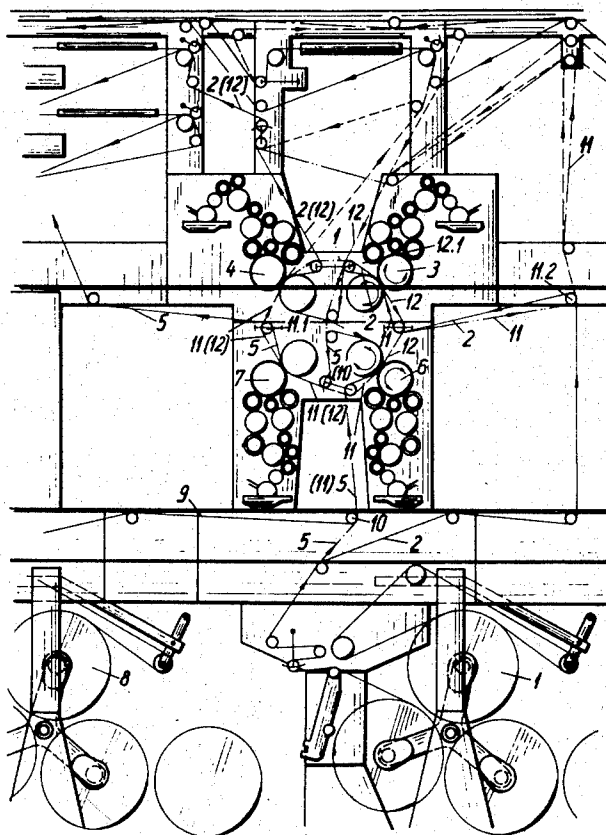
Assistant Examiner—Gene A. Church

Attorney—Jones & Lockwood

[57] **ABSTRACT**

The invention relates to a device for webbing a rotary printing press. There is a rack guide rail track leading from adjacent the web supply in the printing press between the inside of the frame and the adjacent edge of the paper web being threaded through the printing press and printing couples. The rail track follows the desired path through the press. There are branch-off tracks connected by pivoted switch sections. Also, there are track sections connected by cross over centrally pivoted switch sections. A motorized carriage is propelled along the rail track and movably affixed to the rack guide rail track as it is moved therealong by suitable drive gearing cooperating with the rack on the track. The carriage has a gripper which is at its trailing end and it grips the leading edge of the paper web being threaded through the press. Suitable controls for the switches are provided for different lead-in paths through the printing press.

34 Claims, 12 Drawing Figures



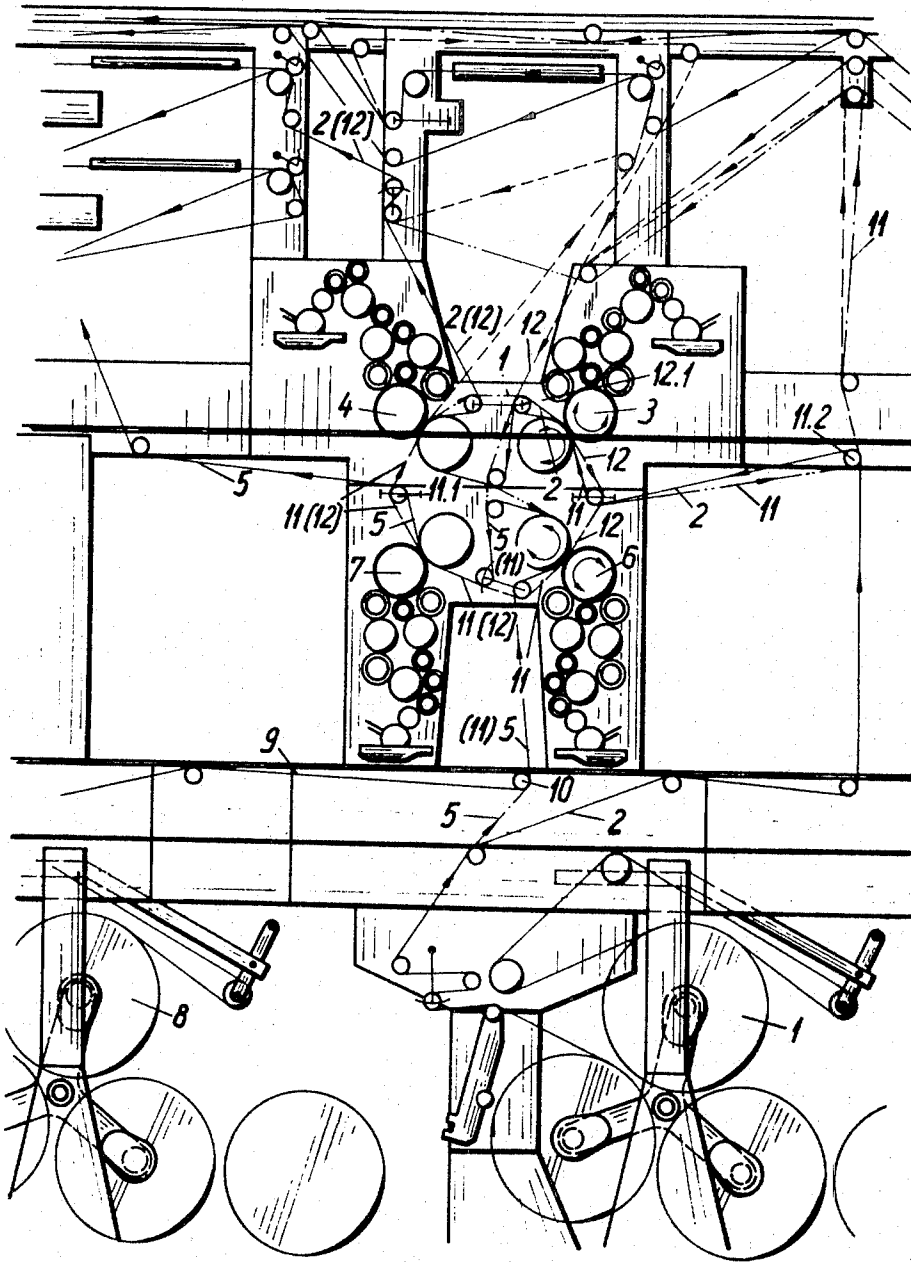


Fig. 1

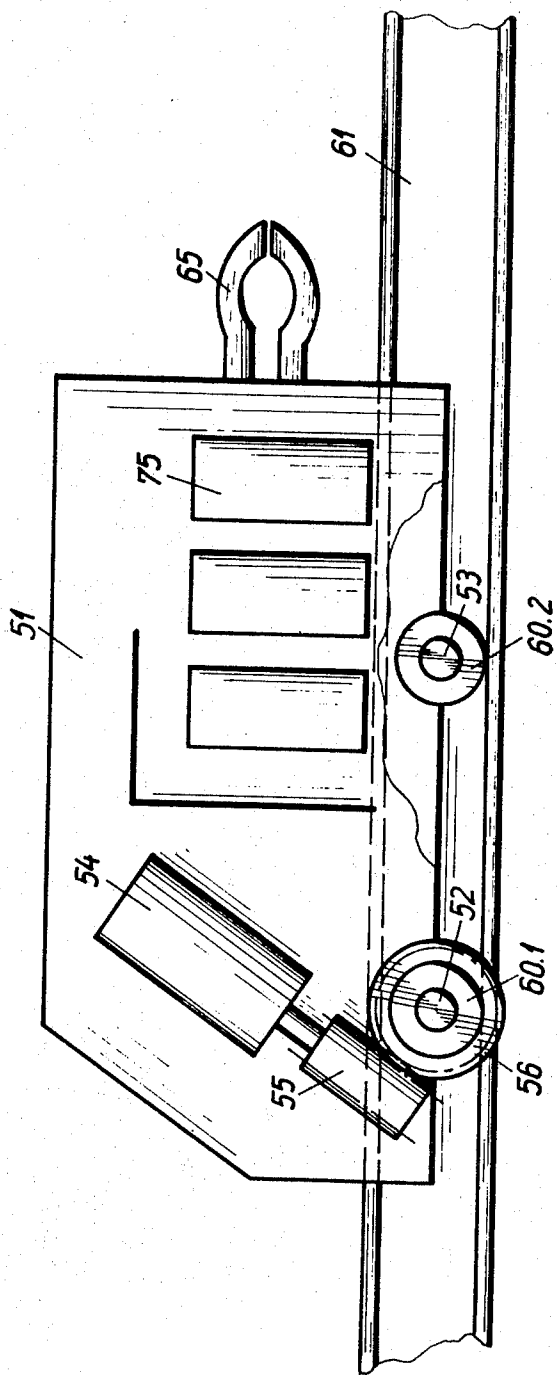


Fig. 2

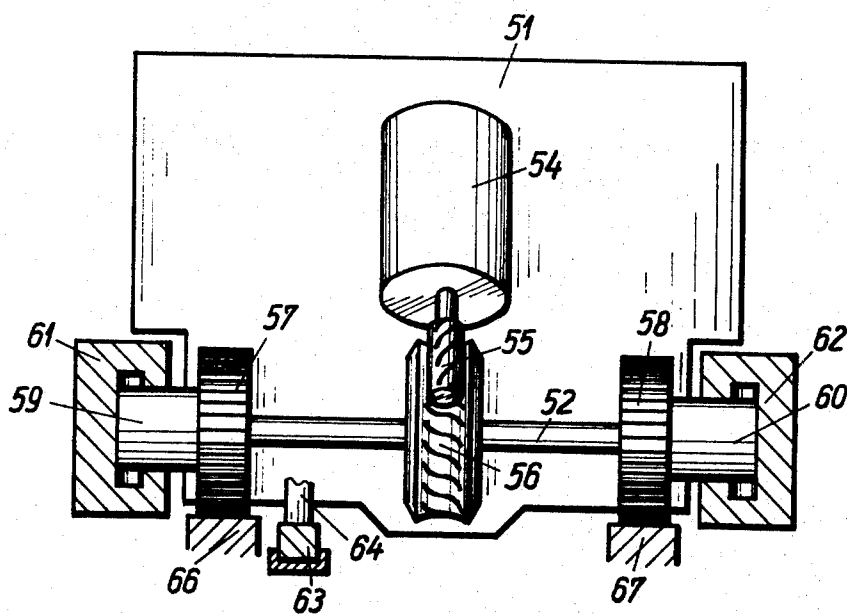


Fig. 3

Fig. 4

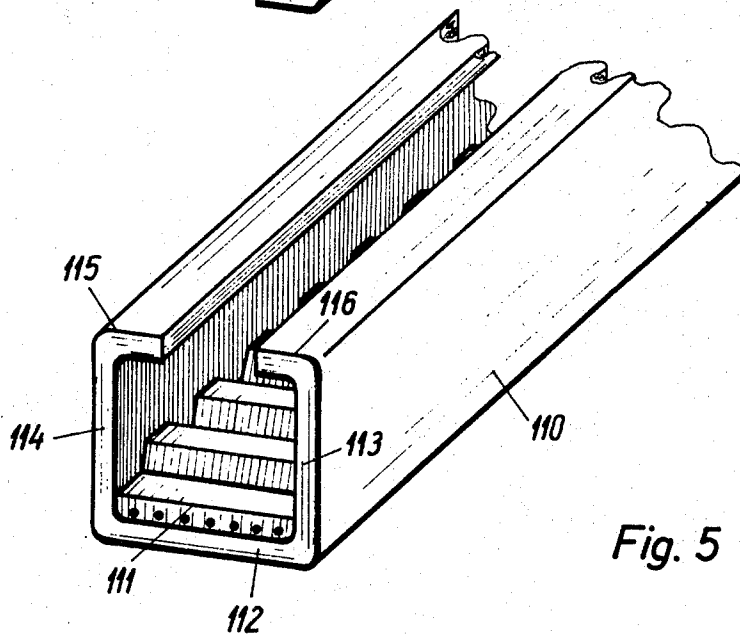
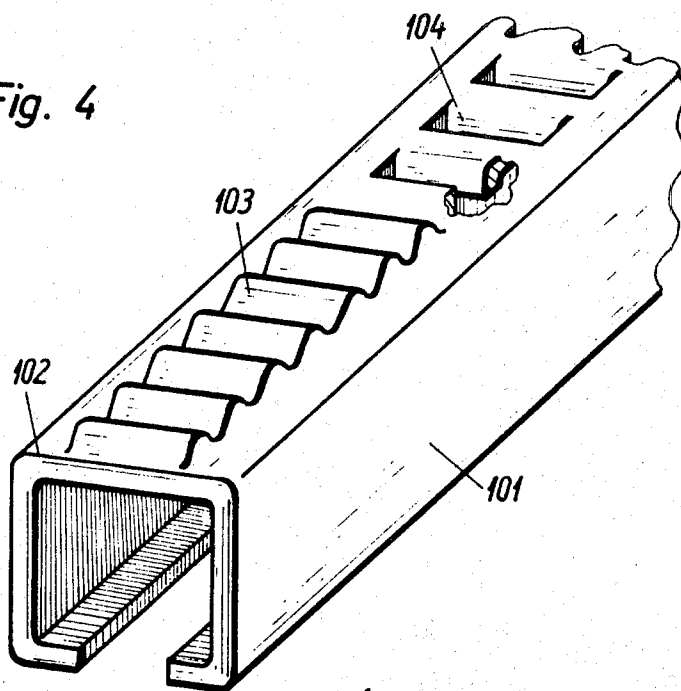


Fig. 5

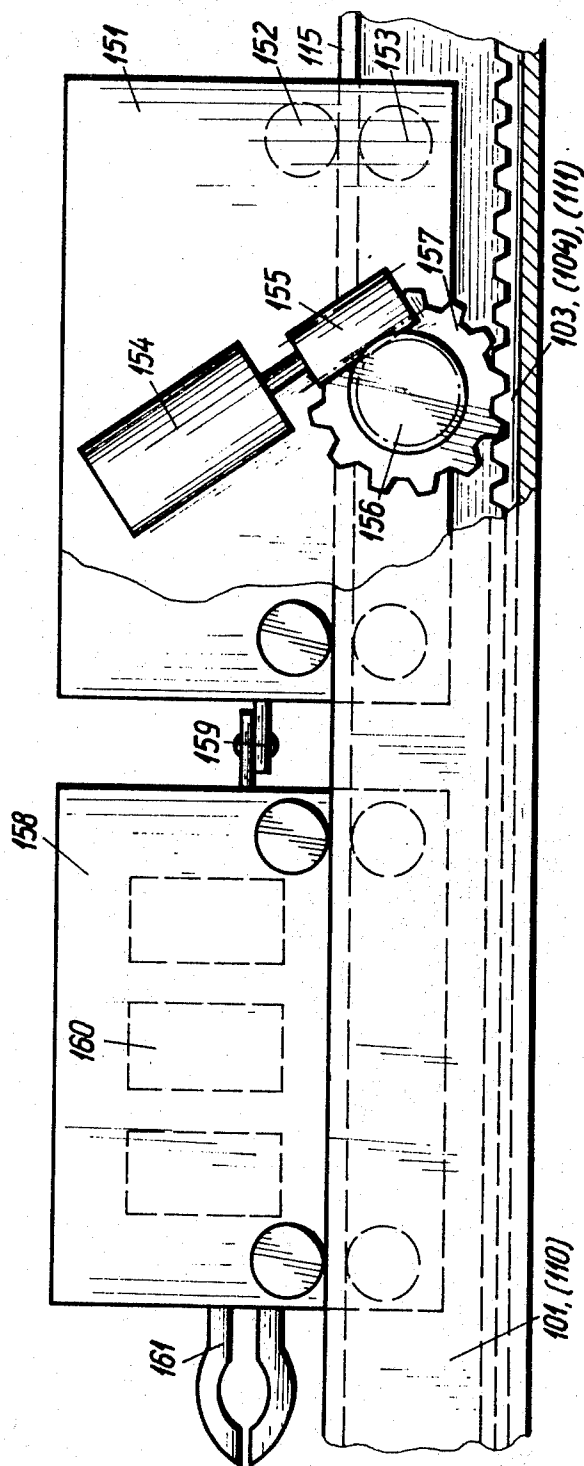


Fig. 6

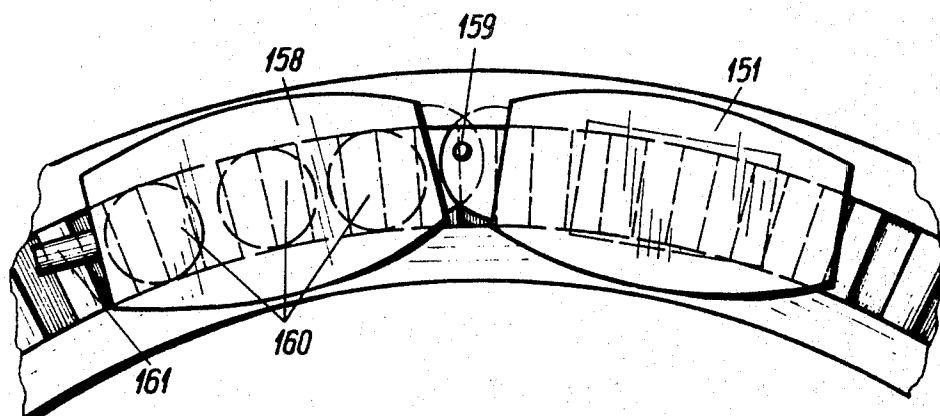


Fig. 7

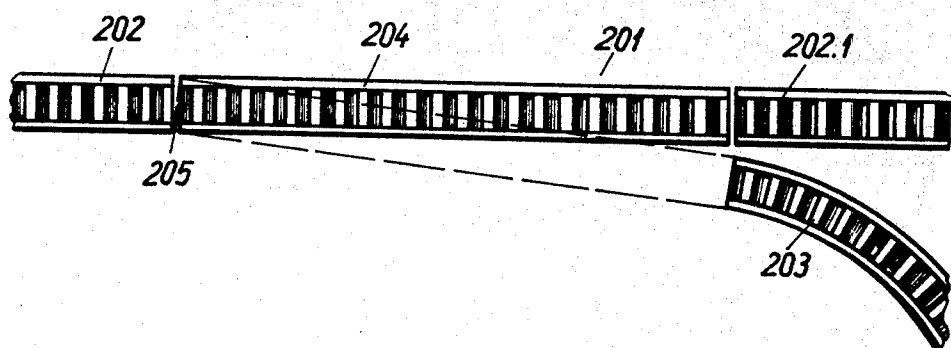


Fig. 9

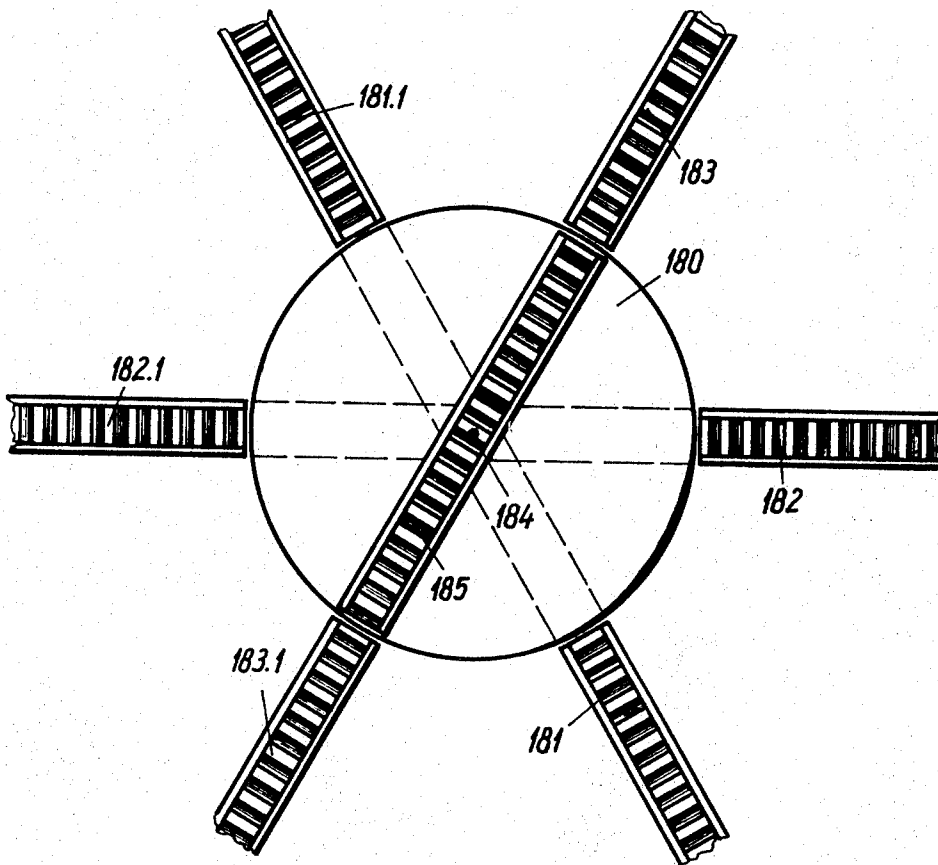


Fig. 8

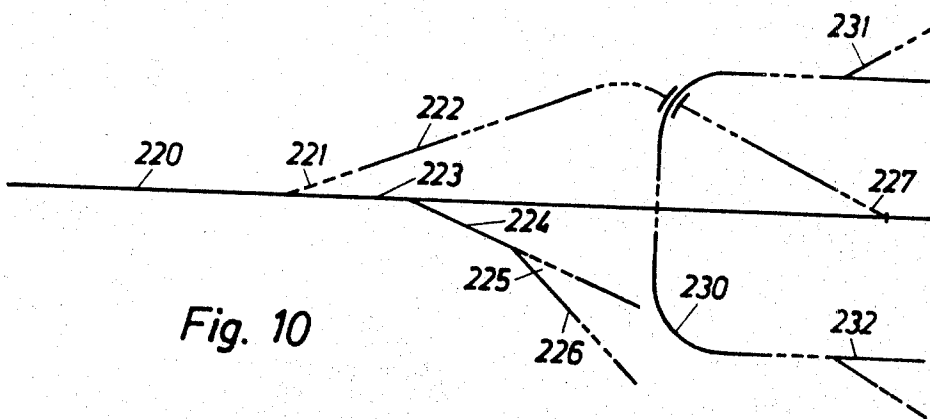


Fig. 10

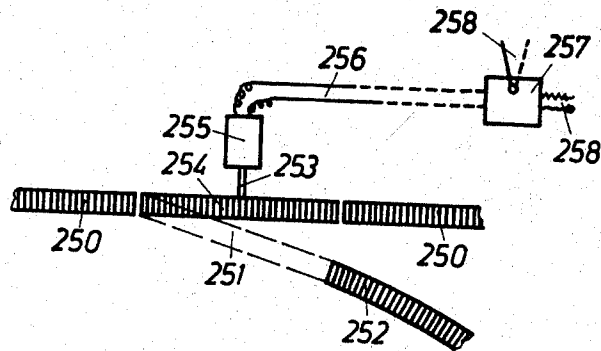


Fig. 11

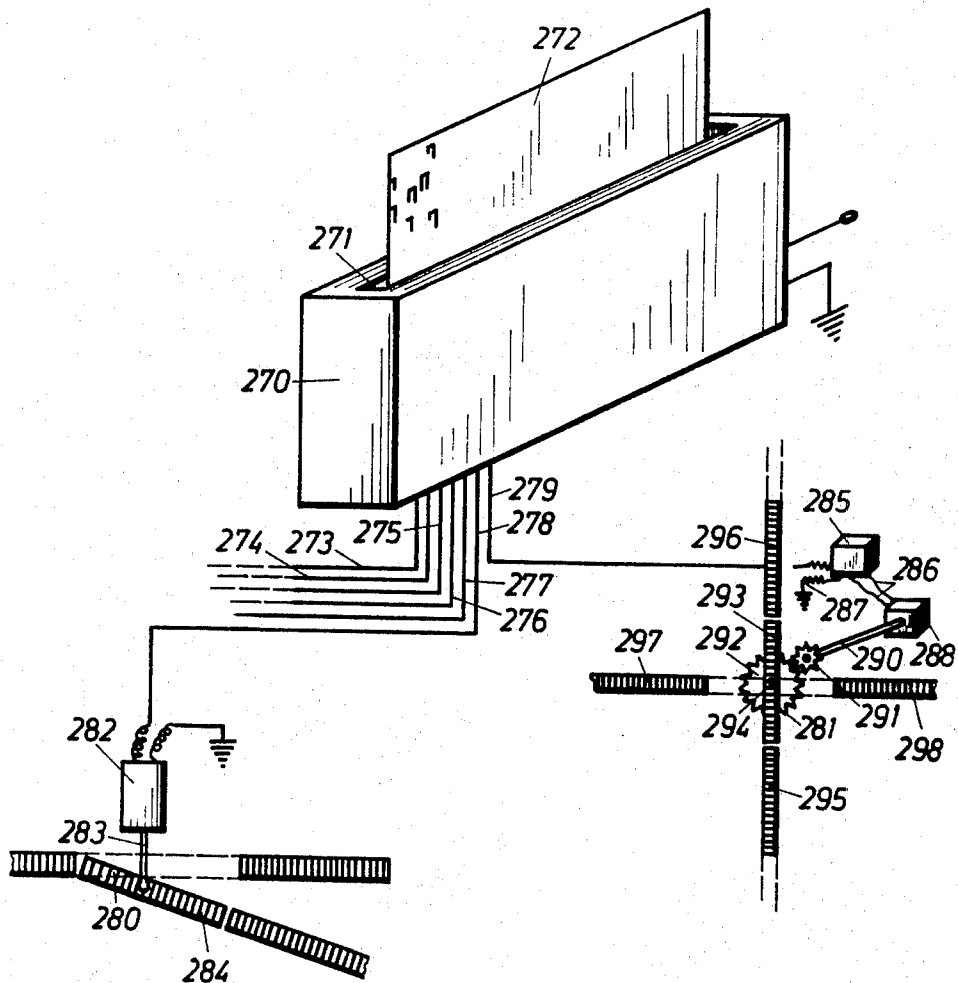


Fig. 12

DEVICE FOR WEBBING A ROTARY PRINTING PRESS

PRIOR ART

Webbing devices of this type have already become wellknown. For instance, the inside of rotary printing presses between side frame and paper web incorporates lead-in tape systems which can be coupled with the rotary press and carry the paper web at threading speed around various web-guiding rollers up to the first printing unit. In particular cases lead-in tape systems have already been built which carry the paper web through the printing unit and up to the turner bars or to the roller on top of the former. Lead-in chain systems have already been used instead of lead-in tape systems.

These hitherto known systems of lead-in tapes or belts and lead-in chains have, however, the disadvantage that only one single web lead is possible. In large-scale rotary presses there is, however, a great variety of possibilities in running the individual paper webs. For instance, one unwinding arrangement can be associated with two or three different printing units. Regarding paper leads after the printing units sometimes turner bars will be used, sometimes the paper web is carried to the next unit for fourcolor printing, and, furthermore, sometimes the web lead within the unit is varied by converting a recto printing couple into a verso printing couple by means of the so-called reversing gear arrangement. All these various possibilities of webbing cannot be accomplished by one single lead-in tape or belt system of lead-in chain system. However, it is difficult or even impossible to arrange the lead-in tapes in such a number, that all possibilities of web leads can be followed.

SUMMARY OF THE INVENTION

It is an object of the invention to thread a paper web not only along a single predetermined path in a rotary press, but along a plurality of various paths which can be selected at will and correspond to the respective printing requirements.

According to the invention the problem is solved by the fact that the leading edge of the paper web can be seized by a motor carriage which runs on a rack guide between the press side frame and the paper web and carries the paper web from the unwinding arrangement through the printing units to the folder along the guideway desired.

In a further embodiment of the invention the carriage is driven by an electric motor which is equipped with batteries and accumulators, or the current required for the motor can be taken from a power supply conductor whereby the power is transferred to the motor carriage via a current collector.

Preferably the rack has such a profile that it matches the corresponding counterprofile of the motor carriage so that the carriage will not fall out of the rack guide even if the guideway passes through sharp bends and vertical sections.

By means of branching-off points the rack guide or rail track can be split into two or several guides or tracks. Two of several tracks can be overlapped by means of crossing arrangements.

According to the invention the webbing device is provided with such a corresponding number of rack guides, crossing arrangements, and branching-off

points in the rotary press as required by the web threading operation for various web leads.

The branching-off points are adjusted by hand and/or by remote control for any web lead-in path desired.

The lead-in path can be stored on a punched card or another storage medium. According to an alternative solution the branching-off points are adjusted by an automatic setting device which is controlled by the punched card or a similar storage medium.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention is hereinafter described by way of example with reference to the accompanying drawings but it is clearly to be understood that the invention is by no means restricted to the details of this embodiment.

FIG. 1 shows a schematic diagram of the possibilities for a web lead in a printing unit comprising four printing couples;

FIG. 2 shows a side view of the motor carriage with built-in batteries;

FIG. 3 shows a front view of the motor carriage as viewed from the left of FIG. 2;

FIG. 4 shows a variant of the rack guide designed as a C section showing in the left half of the upper surface impressed wavelike toothing while in the right half the teeth are formed by the fact that rectangular cross sections have been mortised and doubled back;

FIG. 5 shows a rack guide made of a C section into which a toothed belt is attached;

FIG. 6 shows a side view of a rack guide in which the motor carriage is running with a portion broken away to show the inside;

FIG. 7 shows a top view of a bend of the rack guide in which runs a motor carriage pulling a battery carriage;

FIG. 8 shows a crossing arrangement serving three rack guides which come from different directions;

FIG. 9 shows a branching-off point in which a second rack guide is branched off from a first one;

FIG. 10 is a line drawing illustrating a rail system;

FIG. 11 shows one remote-control device for a switch point.

FIG. 12 shows a switch point and a crossover switching arrangement being controlled by a punch card.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows the numerous web leads which are possible in a unit with four printing couples of a web rotary press. In the first instance the paper web can be carried from the first unwinding arrangement 1 along a path 2 between the cylinders of the printing couples 3 and 4 or along a path 5 between the cylinders of the printing couples 6 and 7.

However, this path 5 can also be used starting from the web guiding roller 10 by a paper web which comes from a second de-reeling or unwinding arrangement 8 and takes in the first instance the path 9. In the first instance path 11 corresponds to path 5, but branches off from it after printing couple 7, runs over the web-guiding roller 11.1 through the printing couples 4 and 3 and continues in upward direction over the web-guiding roller 11.2. Another path 12 leads the web over the web guiding roller 12.1 through the printing couples 3, 6, 7, and 4. Then the paper web continues to run along path 2. FIG. 1 shows, however, further paths of

web leads which are not described in detail. These web leads and the ones described can be combined with each other at will so that even the one printing unit already shown can accommodate a large number of web leads. Combining these with the units arranged at the right and at the left of the printing unit shown, the possibilities of web leading may run into the hundreds regarding the entire machine.

Thus it is understandable that it is impossible to accomplish web threading for all possible paths by lead-in tape or belt systems.

According to the invention it is suggested to use instead of this a motor carriage 51 which runs on rails and to which is clamped the paper web folded into a tip. In this case the rails are arranged between the side frame and the paper web.

According to FIGS. 2 and 3 the motor carriage consists of a chassis carrying two shafts 52 and 53 of which shaft 52 is driven by a motor 54 through a worm 55 and a worm gear 56. Shaft 52 carries the gears 57 and 58, as well as the track wheels 59 and 60. The track wheels 59 and 60 run between the U-section rails 61 and 62. Shaft 53 is not driven and carries the track wheels 60.2 and 61.2 (not shown) which follow idly the rails 61 and 62. The power for the motor 54 is either supplied by the batteries 75 or the conductor bar 63.

The motor carriage 51 incorporates furthermore a gripper device 65 which seizes the paper web folded into a tip and pulls it through the rotary press. The gears 57 and 58 engage in the racks 66 and 67.

FIG. 4 shows another expedient type of rail construction. The rail guide is based on a C section 101 of plastic material or metal. In one or in two of the surfaces 102 forming the profile there is a toothed profile 103 or 104 which is either embossed as 103 or pressed in as shown at 104.

Another possibility is shown in FIG. 5 by a C section 110 into which a commercial toothed belt 111 secured by adhering. The profile consists of the back 112, the lateral parts 113, 114 and the rolling surfaces 115, 116 for the guide wheels of the motor carriage.

FIG. 6 depicts a motor carriage 151 which is guided in the C section by means of rollers 152, 153 or a groove. The rollers 152, 153 run on the rolling surfaces 115 and 116 of the C section 101 or 110. The motor carriage 151 is driven by an electric motor 154 via a worm 155 and a worm gear 156. The worm gear 156 is firmly joined to a gear wheel 157 which engages into the toothing 103 or 104 or in the toothed belt 111.

FIG. 7 shows the top view of a bend of the rack guide in which runs a motor carriage 151 to which a battery carriage 158 as also shown in FIG. 6 is coupled. The coupling 159 between the two carriages can be easily loosened so that the batteries 160 can be charged by connecting them to a supply unit which is not shown, whereas a second battery carriage 158 is used for supplying the power to the motor carriage 151.

The battery carriage 158 is provided with a gripper device 161, similar to the gripper device 65 on the motor carriage 51 in FIGS. 2 and 3, which seizes the paper web folded into a tip.

FIG. 8 depicts a crossing arrangement 180 in which, as an example, three rack tracks 181, 182, 183 are crossing. On the point of crossing 184 a rack rail 185 is pivoted. The drawing depicts the moment in which the rail 183.1 is connected to the rail 183. By turning

the rail 185 the rails 181, and 181.1 or the rails 182 and 182.1 can be connected to each other.

FIG. 9 depicts a branching-off point 201 by means of which a second rail track 203 can be led off from a straight rail track 202, 202.1. For this purpose a rail section 204 is pivoted around a pivot 205.

FIG. 10 is a line drawing illustrating a rail system.

From a rail 220 one track 222 can be branched off to the left by means of a switch point 221 and one track 224 to the right by means of a switch point 223 which branches off into the tracks 224 and 226 at the switch point 225.

By means of the switch point 227 the rail 222 is guided again to the rail 220.

Another rail system consists of the rail 230 and branches off at the switch points 231 and 232. The rail 230 crosses the rail 220. The crossing point incorporates a crossover switching section arrangement already described in FIG. 8 which allows a crossover in one direction.

FIG. 11 shows one remote-control device for a switch point. The rail track 250 incorporates a switch point 251 which can accomplish the connection from the rail 250 to a branched-off rail 252. The switch point is actuated by a solenoid 255 the operator rod 253 of which is mounted flexibly with the rail track 254. The coil of the solenoid 255 is connected to a switch 257 by one pair of wires 256. A power supply 258 is connected to the switch 257. The flow of the power supply to the solenoid 255 can be blocked in the switch 257 by moving an operator lever 258. In blocked state the rail track 254 is then in one position and in non-blocked state it is in the other position.

FIG. 12 shows how, for instance, a switch point and a crossover switching arrangement being controlled by a punch card.

A black box 270 is provided with a slot 271 into which a punch card 272 will be inserted. The punch card 272 is provided with holes according to a desired program for a specific rail track in the machine. The black box 270 accommodates a punch reader which scans the punched holes of the punch card 272 and converts them into electrical values. The black box 270 contains furthermore an interconnection and also a storage device. From there come the control leads 273 to 279 of which the electrical control lead 278, for instance, serves for controlling a switch point 280 and the electrical control lead 279 for controlling a crossover switching section arrangement 281. As described in FIG. 11, the switch point 280 is controlled by means of a solenoid 282 the operator rod 283 of which is connected to the rail track 284 of the switch point 280.

The electrical control lead 279 is laid to a control box for the motor 285 from which 3 leads are taken off, one (287) to the common ground and two leads 286 to a motor 288. Its shaft 290 carries a pinion 291 meshing with a gear 292. This gear 292 is firmly connected to the shaft 294 of a rail track 293. The shaft 294 is pivoted in the frame of the printing press. The rail track serves for joining the rail tracks 295 and 296 and, after having turned it correspondingly around the shaft 294, can join the rail tracks 297 and 298 with one another.

The pulses transmitted through the electrical control lead 279 bring about that the rail track 293 moves from the position shown into the position in which the tracks 297 and 298 are joined with one another. If a punch card 272 programmed for another rail track required

is inserted into a black box 270, it can happen that the switch point 280 and the crossover switching section arrangement 281 are not moved, because it is not necessary in this case. Then probably other switch points of the rail track are operated (not shown). For that reason a specific card 272 is punched for every track required and held in preparation for using it in the black box 270.

What is claimed is:

1. In combination, a rotary printing press having a frame which carries a reel means for a web supply and a plurality of printing couplings, said printing couplings defining a plurality of paths through which said web can be threaded, a guide rail means carried on said press frame, said guide rail means being disposed in a vertical plane between a side of the press frame and the web and vertically arranged one under the other, said guide rail means including crossing arrangement means and branch-off devices to provide a plurality of web paths for web threading operations of the press, a carriage adapted to be mounted on said guide rail means, a propelling means mounted in said carriage and cooperating with said guide rail means to cause said carriage to move along said guide rail means, a gripper means secured to said carriage for gripping the leading edge of said web, whereby said web can be threaded through the press along said plurality of web paths as said carriage moves along said guide rail means.

2. In combination, a rotary printing press having a frame which carries a reel means for a web supply and a plurality of printing couplings, said printing couplings defining a plurality of paths through which said web can be threaded, a guide rail means carried on said press frame, said guide rail means being disposed between a side of the press frame and the web, said rail means having a plurality of paths coinciding with the plurality of web paths through said press, a carriage adapted to be mounted on said rail means, a propelling means mounted on said carriage and cooperating with said rail means to cause said carriage to move along said rail means, a gripper means secured to said carriage for gripping the leading edge of said web, whereby said web can be threaded through the press along said plurality of web paths as said carriage moves along said rail means, aid propelling means including an electric drive motor and batteries or accumulators for powering the same.

3. Apparatus according to claim 2, further including power supply conductor means extending through the press contiguous to the guide rail means and current collector means contacting the conductor means for collecting current from the conductor means for transfer to the electric motor, batteries and accumulator.

4. Apparatus according to claim 3, wherein said guide rail means and said carriage each have cooperating retaining means for holding said carriage on said guide rail means regardless of the position attitude of said guide rail means.

5. Apparatus according to claim 4 wherein said guide rail means includes a first rack track, a pivoted switching section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track making up a branch off connectable to said first rack track by said pivoted section.

6. Apparatus according to claim 5 wherein said guide rail means includes at least one pivoted switching section

pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

7. Apparatus according to claim 4 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

8. Apparatus according to claim 3 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

9. Apparatus according to claim 3 wherein said guide rail means includes a first rack track, a pivoted switching section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track making up a branch off connectable to said first rack track by said pivoted section.

10. Apparatus according to claim 9 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

11. Apparatus according to claim 2 wherein said guide rail means and said carriage each have cooperating retaining means for holding said carriage on said guide rail means regardless of the position attitude of said guide rail means.

12. Apparatus according to claim 11 wherein said guide rail means includes a first rack track, a pivoted switching section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track making up a branch off connectable to said first rack track by said pivoted section.

13. Apparatus according to claim 12 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

14. Apparatus according to claim 11 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

15. In combination, a rotary printing press having a frame which carries a reel means for a web supply and a plurality of printing couplings, said printing couplings defining a plurality of paths through which said web can be threaded, a guide rail means carried on said press frame, said guide rail means being disposed between a side of the press frame and the web, said rail means having a plurality of paths coinciding with the plurality of web paths through said press, a carriage adapted to be mounted on said rail means, a propelling means mounted on said carriage and cooperating with said rail means to cause said carriage to move along said rail means, a gripper means secured to said carriage for gripping the leading edge of said web,

whereby said web can be threaded through the press along the plurality of web paths as said carriage moves along said rail means, said propelling means including an electric motor, power supply conductor means extending through the press contiguous to the guide rail means and current collector means contacting the conductor means for collecting current from the conductor means for transfer to said electric motor.

16. Apparatus according to claim 15 wherein said guide rail means and said carriage each have cooperating retaining means for holding said carriage on said guide rail means regardless of the position attitude of said guide rail means.

17. Apparatus according to claim 16 wherein said guide rail means includes a first rack track, a pivoted switching section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track making up a branch off connectable to said first rack track by said pivoted section.

18. Apparatus according to claim 17 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

19. Apparatus according to claim 16 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

20. Apparatus according to claim 15 wherein said guide rail means includes a first rack track, a pivoted switching section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track making up a branch off connectable to said first rack track by said pivoted section.

21. Apparatus according to claim 20 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

22. Apparatus according to claim 15 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

23. In combination, a rotary printing press having a frame which carries a reel means for a web supply and a plurality of printing couplings, said printing couplings defining a plurality of paths through which said web can be threaded, a guide rail means carried on said press frame, said guide rail means being disposed between a side of the press frame and the web, said rail means having a plurality of paths coinciding with the plurality of web paths through said press, a carriage adapted to be mounted on said rail means, a propelling means mounted on said carriage and cooperating with said rail means to cause said carriage to move along said rail means, a gripper means secured to said carriage for gripping the leading edge of said web, whereby said web can be threaded through the press along said plurality of web paths as said carriage moves

along said rail means, said guide rail means and said carriage each having cooperating retaining means for holding said carriage on said guide rail means regardless of the position attitude of said guide rail means.

24. Apparatus according to claim 23 wherein said guide rail means includes a first rack track, a pivoted switching section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track making up a branch off connectable to said first rack track by said pivoted section.

25. Apparatus according to claim 24 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

26. Apparatus according to claim 23 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

27. In combination, a rotary printing press having a frame which carries a reel means for a web supply and a plurality of printing couplings, said printing couplings defining a plurality of paths through which said web can be threaded, a guide rail means carried on said press frame, said guide rail means being disposed between a side of the press frame and the web, said rail means having a plurality of paths coinciding with the plurality of web paths through said press, a carriage adapted to be mounted on said rail means, a propelling means mounted on said carriage and cooperating with said rail means to cause said carriage to move along said rail means, a gripper means secured to said carriage for gripping the leading edge of said web, whereby said web can be threaded through the press along said plurality of web paths as said carriage moves along said rail means, said guide rail means including a first rack track, a pivoted switch section pivoted at one end in the direction from which said carriage comes during webbing of said press and at least one additional rack track by said pivoted section.

28. Apparatus according to claim 27 wherein said guide rail means includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted section.

29. The apparatus according to claim 27, wherein said guide rail means further includes at least one pivoted switching section pivoted at its center and a plurality of rack tracks leading off in radial directions from said pivoted switching center section which can be selectively connected to said pivoted center section.

30. Apparatus according to claim 29 wherein said pivoted switching sections are adjusted to a switching position by hand for any paper web lead-in path desired for said printing press.

31. Apparatus according to claim 29 including operator means for pivoting said pivoted switching sections and control means connected with said operator means for operation from a remote position for any web lead-in path desired in said printing press.

32. Apparatus according to claim 29 including operating means for pivoting said pivoted switching sections

and individual stored programm means for web lead-in paths in said printing press, said programm means being operatively connected to said pivoted switching sections, operating means for adjusting automatically all branching-off points and crossing arrangements for the predetermined rail track guideway of the lead-in path according to said selected stored programm means.

33. In combination, a rotary printing press having a frame which carries a reel means for a web supply and a plurality of printing couplings, said printing couplings defining a plurality of paths through which said web can be threaded, a guide rail means carried on said press frame, said guide rail means being disposed between a side of the press frame and the web, said rail means having a plurality of paths coinciding with the plurality of web paths through said press, a carriage adapted to be mounted on said rail means, a propelling means mounted on said carriage and cooperating with said rail means to cause said carriage to move along said rail means, a gripper means secured to said carriage for gripping the leading edge of said web, whereby said web can be threaded through the press along said plurality of web paths as said carriage moves along said rail means, said guide rail means including at least one pivot switching section pivoted at its center

and a plurality of rack tracks leading off in radial direction from said pivoted switching center section which can be selectively connected to said pivoted section.

34. Apparatus for webbing rotary printing presses having a plurality of printing couples comprising, in combination,

rack guide means adapted to be positioned in a vertical plane one under the other between a press side frame and the paper webs being threaded through the press and the printing couples from supply reels of unwinding units,

motor carriage mounted on each of said rack guide means and having propelling means cooperating with the rack guide means for movement of the carriage thereon and through said press and printing couples and having a gripper means gripping the leading edge of said paper web, and including sufficient rail means, crossing arrangement means and branching-off devices to provide a plurality of web paths for the web threading operations of the press whereby said motor carriage guides said paper web through the press and printing couples for webbing the same and leads the paper web thence to a folder along the rack guide.

* * * * *

30

35

40

45

50

55

60

65