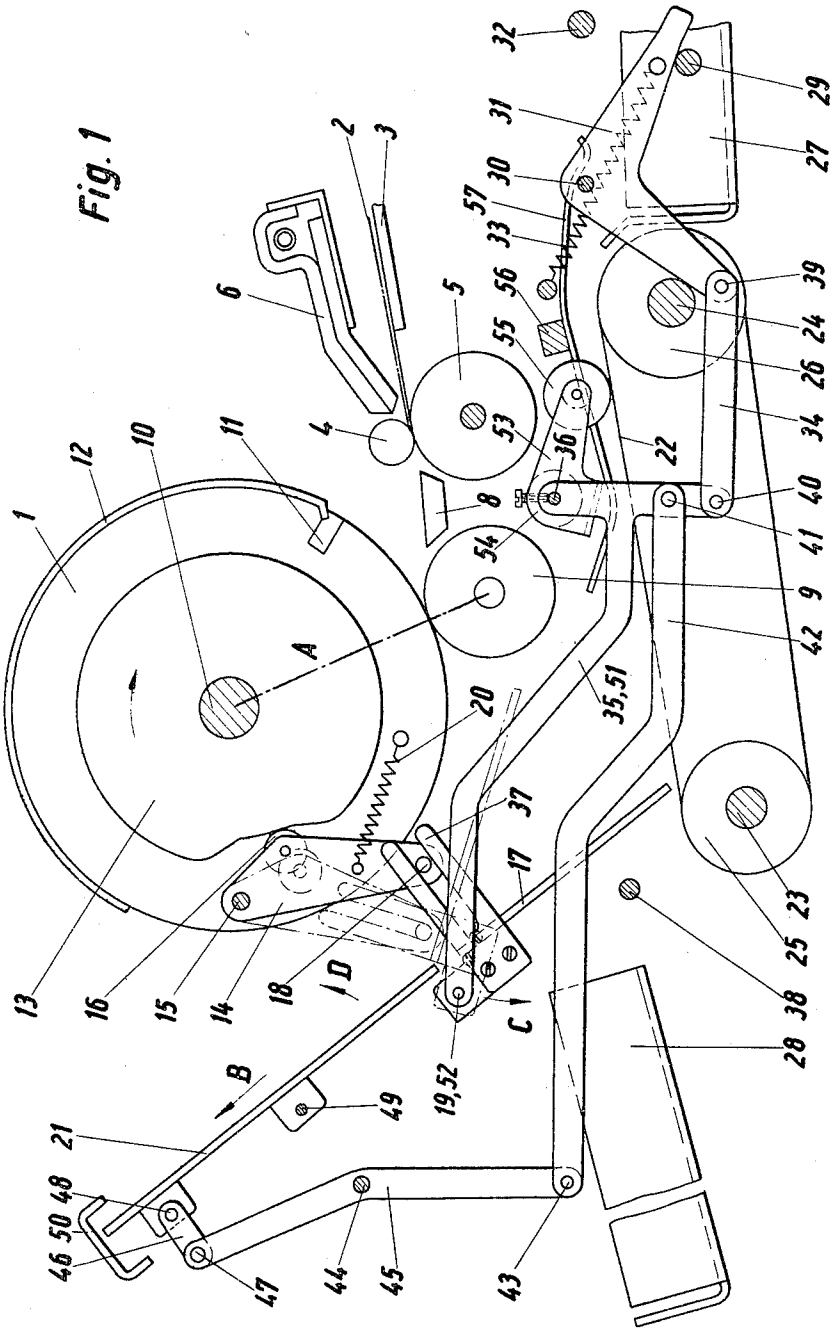
Jan. 13, 1970 G. RITZERFELD 3,489,083

SHEET RECEIVING ARRANGEMENT FOR PRINTING MACHINES

Filed June 19, 1967 3 Sheets-Sheet 1

Fig. 1



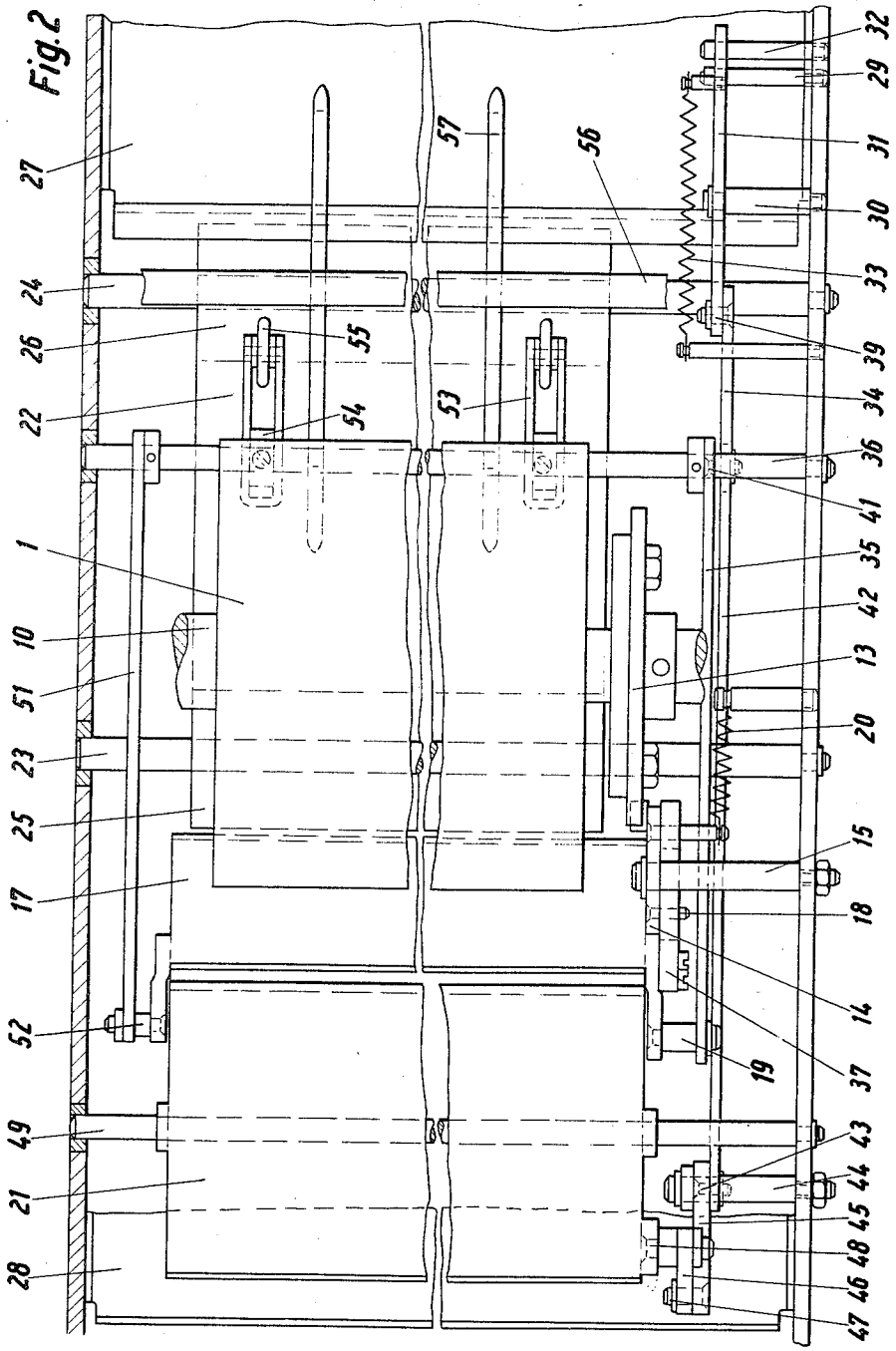
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SHEET RECEIVING ARRANGEMENT FOR PRINTING MACHINES

Filed June 19, 1967 3 Sheets-Sheet 2

Fig. 2



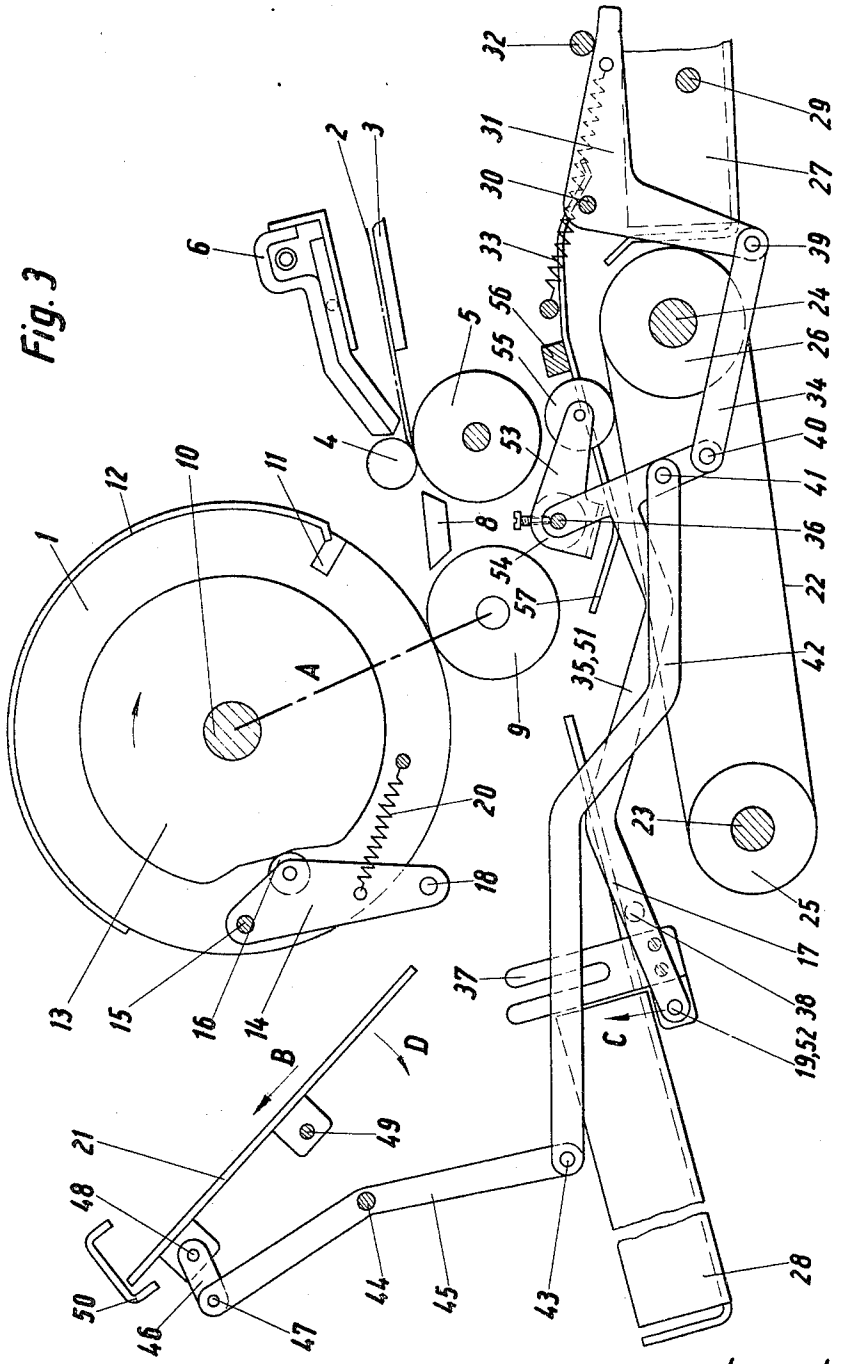
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SHEET RECEIVING ARRANGEMENT FOR PRINTING MACHINES

Filed June 19, 1967 3 Sheets-Sheet 3

Fig. 3



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SHEET RECEIVING ARRANGEMENT FOR PRINTING MACHINES

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U.S. Cl. 101—232 12 Claims

ABSTRACT OF THE DISCLOSURE

A rotary duplicator has receiving boxes in front and rear of the printing roller. Manual means are operable to shift a guide table between a first position in which the guide table guides printed sheets to one of the receiving boxes, and a second position in which the guide table is coupled to a cam follower actuated by a cam on the printing roller to move the guide table between a sheet receiving position, and a position for depositing the received sheet on a conveyor which carries the sheet to the other receiving box.

BACKGROUND OF THE INVENTION

It is known to provide printing machines, such as a rotary duplicator, with means in front and in the rear of the printing roller for receiving printed sheets selectively on one or the other side of the machine.

The constructions according to the prior art have reversible conveyors which are uneconomical and further have the disadvantage that when certain types of paper are used, the new print is smeared by engagement with pressure roller cooperating with the conveyors. Another disadvantage of conventional constructions for this purpose is the difficulty in obtaining satisfactory stacking of the sheets on the front and rear receiving tables.

SUMMARY OF THE INVENTION

It is one object of the invention to overcome the disadvantages of known constructions for depositing printed sheets in front and rear of a printing machine, and to provide a simple and efficient apparatus serving this purpose.

Another object of the invention is to provide a sheet receiving arrangement for a duplicating machine which can be shifted between a condition depositing printed sheets in front, and another condition depositing printed sheets in the rear of the machine.

Another object of the invention is to use a guide means for guiding the printed sheets selectively to the front or rear of the machine, and to operate the guide means partly manually, and partly from the drive of the printing means.

With these objects in view, the present invention is concerned with an improvement of a printing machine having printing means, such as a duplicating roller and a counter pressure roller, adapted to discharge a printed sheet. An embodiment of the sheet receiving arrangement according to the invention comprises first and second sheet receiving means located on opposite sides of the machine; a sheet support, such as a steeply inclined table, located on the same side of the machine as the first receiving means; and a guide means, preferably in the form of a second table, pivotally mounted on a carrier linkage.

The guide means is operable between a first position for receiving a discharged sheet and for guiding the sheet onto the first receiving means, a second position for guiding a discharged sheet onto the sheet support, and a third position for guiding a sheet from the sheet support toward the second receiving means, preferably onto a conveyor moving the sheet to the second receiving means.

In the preferred embodiment of the invention, manual operating means shift the guide table between the first position associated with the first receiving means, and one of the second and third positions in which the guide table is coupled to a cam follower driven by a cam in synchronism with the operation of the printing machine. The second and third positions of the guide table are both associated with the second receiving means, inasmuch as the guide table receives the sheet from the printing roller and counter pressure roller in the second position, guides the sheets onto a sheet support table, and is then shifted by the cam and cam follower to the third position forming an extension of the support table permitting the sheet to slide downwardly onto the conveyor which carries it to the second receiving means. Since the first and second receiving means are receiving boxes located in the rear and in the front of the machine, the operator can set the apparatus to an operation in which the sheets are stacked in the rear or in the front of the machine, as desired.

In the preferred embodiment of the invention, the guide table is pivotally mounted on a manually operated carrier linkage so as to be angularly displaced by the cam follower between the second and third positions. When the manually operated carrier linkage is shifted to another position, the guide table is turned with the carrier linkage to a position forming an extension of the receiving box in the rear toward the path along which the printing roller and counterpressure roller deliver the printed sheet.

Preferably, the inclined sheet support table, on which the sheet is temporarily placed while the guide table is in the second position, is pivotally mounted and connected with the carrier linkage so as to be shifted to an inoperative position when the guide table cooperates with the first receiving box. In the inoperative position, the lower end of the support table is so far spaced from the path along which the printed sheets are discharged, that even sheets temporarily adhering to the printing roller cannot engage the lower end of the support table.

Since a discharged printed sheet is pushed up along the guide table and support table, and then slides down, the support table is provided at the upper end with an abutment which reverses the upward movement of the sheets when the same are driven to the highest point of the support table.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the acompanying drawings.

Brief description of the drawing

FIG. 1 is a fragmentary schematic side view, partially in section, illustrating a duplicating machine provided with a sheet receiving arrangement according to one embodiment of the invention;

FIG. 2 is a fragmentary schematic plan view, partially

in section, illustrating the embodiment of FIG. 1; and FIG. 3 is a fragmentary schematic side view corresponding to FIG. 1, but illustrating another operational position of the apparatus.

Description of the preferred embodiment

A duplicating roller **1** carrying a master **12** secured by holding means **11** is rotated in the direction of the arrow by drive shaft **10**. Copy sheet blanks **2** are supplied on a table **3** to a pair of transporting rollers **4** and **5**, and are moistened by a moistening means **6**. Transporting rollers **4** and **5** transport the copy sheet blank over a guide **8** to the bight between printing roller **1** and a counterpressure roller **9** so that the copy sheet blank is imprinted by the text appearing on the master sheet **12**. A one revolution clutch, not shown, stops rotation of the printing roller after each revolution in the initial position shown in FIGS. 1 and 2 in which a follower roller **16** engages a low portion of cam **13** so that the cam follower **14** on which roller **16** is mounted, is held by a spring **20** in the illustrated position in which a coupling pin **18** at the lower end of cam follower lever **14** is located in an open slot of a fork shaped coupling part **37** which is secured to a guide table **17**.

In the initial position of the printing roller and cam **13** shown in FIG. 1, the coupling means **18, 37** holds guide table **17** in a downwardly inclined position aligned with the higher inclined support table **21** which is mounted for pivotal movement about a pin **49**. An abutment channel **50** is located at the upper end of support table **21** which has a bracket connected by pivots **47, 48** and a link **46** to a double armed lever **45** mounted for turning movement about a pivot **44** and connected by a pivot pin **43** to a long link **42**.

As also shown in FIG. 2, the link **42** is connected by a pivot pin **41** to a transverse portion of an operating member **35** which is secured to a shaft **36** to whose other end a correspondingly shaped operating member **51** is secured. The other ends of operating members **35, 51** have pivot pins **19, 52** connected to a bracket secured to guide table **17** and coupling member **35**. A pivot **40** connects operating member **37** with a link **34** which is connected by pivot **39** to a manually operated handle **31** mounted on a pivot **30** for movement between a first operative position shown in FIG. 3 abutting a stop **32**, and a second operative position shown in FIG. 1 abutting stop **29**. A spring **33** is secured to the handle **31** and to a fixed point on the frame of the machine so as to be located on opposite sides of pivot **30** in the two positions of handle **31** whereby the spring holds handle **31** in either position and is most tensioned in a dead-center position intermediate the two operative positions of the handle.

Consequently, when the handle is manually shifted between the positions illustrated in FIGS. 1 and 3, the carrier linkage **34, 35** is shifted, coupling parts **37** and **18** are separated, and guide table **17** is moved until engaging a fixed stop **38** which turns guide table **17** to the position shown in FIG. 3 forming an extension of the bottom of a receiving box **28**, and pointing toward the counterpressure roller **9** so that a sheet discharged from the printing means **1, 9** is received by guide table **17** and guided into the receiving box **28** at the rear of the machine.

When handle **31** is shifted to the position of FIG. 1 while the printing roller **1** is in the initial position and cam follower means **14, 16** cooperate with the low portion of cam **13**, coupling part **37** moves along such a path as to receive coupling pin **18** in its slot so that guide table **17** is coupled in the position of FIG. 1 to cam follower lever **18** which is mounted for pivotal movement on a pivot pin **15** on a frame wall as shown in FIG. 2.

During rotation of the printing roller **1**, the circular cam track of cam **13** is effective to turn cam follower lever to the position indicated in chain lines in FIG. 1 so that guide table **17** is turned to the position shown in chain lines in FIG. 1 while coupling pin **18** moves deeper into the slot of coupling part **37**. Guide table **17** is now positioned to receive a printed sheet discharged by the printing means **1, 9** and to guide the same toward and upward along support table **21** in the direction of the arrow B.

Below the guide table **17** in the position of FIG. 1, a conveyor band **22** is guided about rollers **25, 26** mounted on shafts **23** and **24**, at least one of which is driven to transport a sheet deposited on the conveyor band **22** toward the front of the machine and into a receiving box **27**. Paper guide rollers **55** are mounted on lever means **53** to hold sheets transported by conveyor band **22** on the conveyor band, and lever means **53** are adjustable on shaft **36** by means of adjusting rings **54**. In order to prevent running up of transported sheets on guide rollers **55**, curved sheet guides **57** are provided above conveyor band **22** and supported on a transverse bar **56**.

If the operator desires deposition of the printed sheets in the front receiving box **27**, he places handle **31** in the position of FIG. 1 engaging stop **29**. Carrier linkage **34, 35, 51** moves guide table **17** to the position illustrated in solid lines in FIG. 1 in which the coupling means **18, 37** engage since printing roller **1** is in the initial position of rest and cam follower means **14, 16** engages a depressed cam portion in this position of printing means **1**. Guide table **17** is downwardly inclined toward conveyor band **22** and aligned with the inclined support table **21** which is held in the position of FIG. 1 by the linkage **42, 45, 46**.

The operator now starts the duplicating machine, and printing roller **1** is driven by a one revolution clutch, not shown, to perform one revolution and to stop again when arriving at the initial position shown in FIG. 1. A supplied copy sheet blank **2** is moistened and transported to the printing plane where it is imprinted by the inked text on master sheet **12**. Shortly before the leading end of the master sheet arrives in the printing plane A, the higher circular peripheral portion of cam **13** begins to cooperate with cam follower means **14, 16**, and guide table **17** is turned to the position shown in chain lines in which its front end is located in the proximity of the bight of the printing roller and counterpressure roller and positioned to receive the imprinted copy sheet and to guide the same first onto the lower end of the inclined support table **21** and then higher up the support table in the direction of the arrow B until the leading end of the printed copy sheet engages stop channel **50** whereupon the copy sheet begins to slide downward on support table **21**. At this moment, the depressed portion of cam **13** is again engaged by cam follower means **14, 16** under the action of spring **20** so that guide table **17** is again in the lower position shown in solid lines aligned with support table **21** so that the printed sheet can slide down on guide table **17** onto conveyor band **22** by which it is transported into the receiving box **27** at the front of the machine. Cam **13** is so designed that guide table **17** moves down directly after the trailing end of the printed sheet is released by printing roller **1** and counterpressure roller **9**. Displacement of the printed sheet on transporting band **22** is prevented by the light pressure of rollers **55**.

If the operator desires deposition of the printed sheets at the rear of the machine in receiving box **28**, handle **31** is shifted to the position shown in FIG. 3 so that carrier linkage **34, 35** turns glide table **17** to the position illustrated in FIG. 3 in which guide table **17** rests on stop **38**, forming an extension of the bottom of receiving box **28** toward the region in which the printed sheet is discharged by printing means **1, 9**. Linkage **42, 45, 46** is also displaced and turns support table **21** opposite to the direction of the arrow D to the position of FIG. 3 in which the lower end of support table **21** is raised above the path of movement of the discharged printed sheets so that the same cannot engage support table **21**. The channel shape of stop **50** permits the corresponding displacement of the upper end of support table **21**.

The operator starts the machine and supplies a copy

sheet 2 which is imprinted during the revolution of the printing roller 1, and guided by guide table 17 into the receiving box 28 at the rear of the machine. Cam follower level 14 is oscillated by cam 13, but is inoperative since the coupling parts 18 and 37 are separated.

In the condition of the machine shown in FIG. 3, handle 31, guide table 17 and support table 21 are in a first position. When the handle 31 is shifted, guide table 17 moves in the direction of the arrow C, and support table 21 turns in the direction of the arrow D in FIG. 3. When handle 31 is shifted back into abutment with stop 32, pivot pins 19, 52 move in the direction of the arrow C in FIG. 1, and the lower end of support table table 21 moves in the direction of the arrow D in FIG. 3. In the second position of guide table 17 shown in chain lines in FIG. 1, a discharged printed sheet is guided onto the support table 21, and in the third position of guide table 17 shown in solid lines in FIG. 1, the sheet is guided from sheet support table 21 to the front of the machine.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of printing machines differing from the types described above.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. In a printing machine, in combination, printing means adapted to discharge a printed sheet; a sheet-receiving arrangement comprising first and second sheet-receiving means located on opposite sides of said printing machine; single guide means; means mounting said single guide means movable between a first position wherein one end of said guide means is located in the region of said printing means and the other end thereof cooperates with said first sheet-receiving means for guiding a sheet discharged from said printing means to said first sheet-receiving means, a second position for receiving at said one end thereof a sheet discharged from said printing means and retaining the same while in said second position, and a third position wherein said one end of said guide means is located in the region of said second sheet-receiving means and lower than said other end thereof so that the sheet retained by said guide means in said second position thereof will slide down and towards said second sheet-receiving means and will be received by the latter; means synchronized with movement of said printing means for moving between consecutive discharges of sheets by said printing means said guide means from said second to said third positions thereof and for moving said guide means back to said second position; and operating means for either (a) moving said guide means—without activating said moving means—into said first position thereof or (b) actuating said moving means between consecutive printings so as to move said guide means from said second to said third position thereof whereby discharged sheets can be selectively placed between consecutive printings by said printing means either in said first or said second receiving means on opposite sides of said printing machine.

2. A sheet-receiving arrangement as claimed in claim 1 wherein said synchronized moving means include cam means driven from said printing means, and cam-follower means connected with said guide means for moving the same between said second and third positions.

3. A sheet receiving arrangement as claimed in claim 2 wherein said cam follower means has a first coupling part, and said guide means has a second coupling part; and wherein said coupling parts are disengaged in said first position of said guide means and coupled in said second and third positions of said guide means so that said guide means is moved between said second and third positions by said cam means and cam follower means depending on the position of said printing means.

4. A sheet receiving arrangement as claimed in claim 2 wherein said operating means include manual means connected with said guide means for moving the same between said first, and third positions; said cam follower means having first coupling means; and second coupling means connected with said guide means and being coupled with said first coupling means in said second and third positions of said guide means, and disengaged in said first position of said guide means so that said guide means is operated between said first and second positions in accordance with the positions of the printing means to receive a sheet from said printing means in said second position, and to guide the sheet toward said second receiving means in said third position, and is disconnected from said printing means in said first position thereof.

5. A sheet receiving arrangement as claimed in claim 1 wherein said second sheet-receiving means includes a receiving box, and conveyor means for receiving a sheet from said guide means in said third position, and for transporting said sheet to said receiving box.

6. A sheet-receiving arrangement as claimed in claim 5 comprising movably mounted roller means cooperating with said conveyor means for holding a sheet transported by the same to said receiving box; and curved guide members for guiding transported sheets along said conveyor means and away from said roller means.

7. A sheet-receiving arrangement as claimed in claim 1 wherein said mounting means includes a carrier linkage; wherein said guide means is pivotally mounted on said carrier linkage for movement between said second and third positions, and also movable with said carrier linkage; and wherein said operating means include manual means for moving said carrier linkage between first and second operative positions in which said guide means is in said first position, and in said third position, respectively.

8. A sheet-receiving arrangement as claimed in claim 7 comprising an inclined sheet-supporting first table; wherein said guide means includes a second table pivotally mounted on said carrier linkage below said first table and being located in said second position to receive a sheet from said printing means and to guide the sheet upward onto said first table, and being inclined and aligned with said inclined first table in said third position so that the sheet slides downward on said first and second tables.

9. A sheet-receiving arrangement as claimed in claim 8 wherein said synchronized moving means includes cam means driven from said printing means, and cam-follower means; wherein said cam-follower means has a first coupling part, and said second table has a second coupling part; and wherein said coupling parts are disengaged in said first position of said second table and coupled in said second and third positions of said second table so that said second table is moved between said second and third positions by said cam means and cam-follower means depending on the position of said printing means.

10. A sheet-receiving arrangement as claimed in claim 8 wherein said second sheet-receiving means includes a receiving box and conveyor means; and wherein said second table in said first position is located above said first receiving means, and in said third position is located directly above said conveyor means so that a sheet deposited in said third position on said conveyor means is transported to said receiving box.

11. A sheet receiving arrangement as claimed in claim 8 wherein said first table is mounted for pivotal movement, and is connected with said carrier linkage so that said first table is in a first position located spaced from said second table when said manual means is in said first operative position, and is in a second position for receiving a sheet from said second table in said second position of the same when said manual means is in said second operative position.

12. A sheet receiving arrangement as claimed in claim 8 wherein said second table has one end adjacent the

lower end of said first table and is located slanted to the same in said second position and aligned with the same in said third position of said second table.

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U.S. Cl. X.R.

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