

2233964

- 1 -

PAPER ARRANGING SYSTEM

This invention relates to a paper arranging system capable of stacking a number of paper sheets with their corners neatly arranged, and more particularly to an automatic paper arranging system consisting of a paper arranging device, paper feed rack, bridge plate device, reversing paper feeder and working platform.

When printing on paper is to be done using an automatic printing machine, it is necessary to feed paper into the printing machine under uniform conditions. Also,

where paper sheets of different size are to be cut to the same size, it is necessary to arrange the sheets such that they are aligned at least on two sides thereof. This paper arranging work has conventionally been done entirely by manual operation. When a heavy load of paper is to be handled, it was a hard

labor requiring a lot of time with very poor efficiency. Moreover, such manual operation often led to troubles such as crushed or wrinkled corners as may be caused by dropping the sheets during reversing operation, thus resulting in a lack of uniform paper arranging.

For this reason, the applicant has previously made the study of a paper arranging device capable of automatically and uniformly stacking the loaded sheets of paper by loading a bundle of sheets from above and thus endeavored to improve the working efficiency.

This previous system is designed to reload a bundle of sheets little by little from a paper feed rack installed close to said paper arranging device. In this system, the bundle of sheets was slid through a bridge plate device spanning a gap between the paper feed rack and paper arranging device into the paper arranging device. Moreover, the bundle of sheets was fed into the paper arranging device in the state of being turned over by a reversing device.

However, since the paper arranging device of the above-mentioned structure was too large in height from its installed level to the paper re-loading position, its lower half portion must be half-embedded under the floor level or a tall working platform on which a worker gets on must be

provided.

Therefore, in the former case, the factory floor must be re-constructed for the purpose of installing the device, thus leading sometimes to the case where it is impossible to install the device because the building can not be re-constructed for structural reasons. In the latter case, the working platform is positioned in the front of the device, thus leading to the difficulty of carrying the paper to and from the paper feed rack and paper arranging device. In addition, since the working position is higher, there may be much more danger of dropping.

This invention has been made with a view to solving the foregoing problems, and an object of this invention is to provide a paper arranging system capable of sliding a bundle of paper sheets from a paper feed rack through a bridge plate to a paper arranging device, reversing the bundle and stacking it by said paper arranging device, which can perform paper arranging by simple operation, permits simplified installation of itself and easy carrying in and out of paper sheets and is superior in safety and operation efficiency.

Another object of this invention is to provide a

reversing mechanism of simple construction which can reverse a bundle of sheets without causing troubles such as wrinkling and folding by simple operation and can feed air between the sheets simultaneously with reversing while the bundle of sheets is being slid on the bridge plate from the paper feed rack to paper arranging device.

One more object of this invention is to provide a lifting mechanism for supporting and holding the stacked sheets of heavy load at a predetermined level with safety and accuracy.

According to the present invention, there is provided a paper arranging system comprising:
a paper feed rack for initially receiving a bundle of paper sheets;
a paper arranging device located adjacent to said paper feed rack for receiving and stacking the bundle of paper sheets after the bundle has been transferred from the paper feed rack to the paper arranging device, the paper arranging device incorporating a vibration plate on an inner wall thereof, driven by a vibrating mechanism, so as to uniformly align at least two sides of the paper sheets and a corner defined therebetween;
means for assisting conveyance of the paper sheets from the paper feed rack to the paper arranging device; and
a working platform disposed in front of the paper feed rack and the paper arranging device, said platform being pivotable between a horizontal position, at which an operator may be supported thereon for performance of a paper reloading operation, and a vertical position at which the platform is moved away from the front of the paper feed rack and paper arranging device, means being provided for movement of the platform between the horizontal and vertical positions.

Said paper feed rack and paper arranging device should preferably be placed adjacent inwardly and at an angle to each other. Moreover, it is possible to install a paper loading plate holder adjacent to the paper feed rack and drive a lifting frame disposed within the plate holder for lifting and lowering paper loading plates.

Said lifting frame for paper loading on the paper feed rack and paper arranging device can be designed to constitute a preferred embodiment by fixing the bases of a multiple number of forwardly extending forked rods to the supporting rods bridged transversely over the rear end of such frame in such manner as to permit adjustment of sliding position and place the paper loading plate on the upper surface of such forked rods.

Further, it is possible to install a reversing mechanism which includes a reversing shaft comprising a roll set horizontally in a cantilevered manner, above the bridge plate device spanning between the paper feed rack and paper arranging device so as to intersect the paper feed direction and which is rotationally driven by a suitable rotary drive unit in the direction opposite to the paper feed direction on said bridge plate, and a keep disk set in such manner with respect to the reversing roll as to be freely pivotable into and out of contact with the surface of said roll and to be pressed as a paper pressing

means against such roll surface according to the timing of paper feed to the roll.

Said lifting frame for paper loading or for loading the paper loading plate on the paper feed rack, the paper arranging device and plate holder is such that a guide rail extending perpendicularly is fixed, a bearing roller fitted to said lifting frame is set in a sliding contact manner upon such guide rail for the purpose of controlling the movements of the paper or plates in the depth and width directions, and the front and rear side ends are suspended by a chain, respectively. The two chains are respectively passed through a support chain wheel disposed perpendicularly above them and then engaged with a drive chain wheel fitted to both ends of a drive shaft set in a bridged manner. The free ends of the two chains are respectively suspended over the drive chain wheel and connected to a lifting mechanism for driving said drive shaft in a normal or reverse direction by a rotational drive means such as motor.

In the rear of the paper feed level position of said paper feed rack, it is preferable to install a mirror for checking the paper feed level of loaded paper.

The paper arranging system is so designed as to ensure that in the paper stacking system consisting of a paper arranging device, a paper feed rack, a bridge plate device, a

reversing paper feeder, a plate holder and working platform, as well as central control unit for controlling and driving these devices, transportation of the paper into and out of the devices can be performed at floor level because the working platform is constructed to be freely foldable, thus removing it from the front of the paper arranging device, the paper feed rack and the plate holder.

Moreover, since the lifting frame for paper loading on the paper feed rack and paper arranging device is of such construction that the bases of multiple number of forked rods extending forwardly to the supporting rods bridged transversely over the rear end of such frame are fitted so as to permit adjustment of sliding position, a forklift will not cause interference at the time of carrying in or out of paper, thus ensuring easy operation.

Furthermore, the reversing paper feed device installed on the bridge plate device releases a worker from the necessity of bearing the total weight of bundled sheets by himself, thus leading to an improved efficiency of operation.

In addition, since the lifting frame for the paper arranging device, paper feed rack and plate holder is composed of a lifting mechanism suspended by chains, it is simplified in construction and is able to perform slip-free positive position control.

Various other features and attendant advantages of the present invention will become more apparent from the following detailed description of preferred embodiments of the invention as illustrated in the accompanying drawings, in which:

FIG. 1 is a front view showing the general arrangement of one embodiment of the paper arranging system of the present invention;

FIG. 2 is a top view showing the general arrangement of one embodiment of the paper arranging system of the present invention;

FIG. 3 is a front view showing one embodiment of the paper arranging device;

FIG. 4 is a cross-sectional view of the device of FIG. 3 taken along the line IV-IV of FIG. 3;

FIG. 5 is a cross-sectional view of the device of FIG. 3 taken along the line V-V of FIG. 3;

FIG. 6 is a cross-sectional view of the device of FIG. 3 taken along the line VI-VI of FIG. 3;

FIG. 7 is a front view of the lifting mechanism;

FIG. 8 is a longitudinal section showing one embodiment of the paper feed rack;

FIG. 9 is a perspective view showing one embodiment of the bridge plate device and reversing paper feed device;

FIG. 10 is a front view showing one embodiment of the bridge plate device and reversing paper feed device;

FIG. 11 is a longitudinal section showing one embodiment of the plate holder; and

FIG. 12 is a front view showing the main portion of the driving mechanism for the working platform.

A paper arranging system of the present invention comprises paper arranging device 1, paper feed rack 2, bridge plate device 3 installed therebetween, reversing paper feed device 4 installed above the bridge plate 3, plate holder 5 installed by the side of paper feed rack 2 and working platform 6 installed in the front of these devices, as well as a central control unit (not shown) for controlling and driving all of said devices.

Paper arranging device 1 constitutes, as shown in FIG. 3 to FIG. 6, a paper loading frame of front-open type consisting of a machine frame 101, an inclined frame 102 supported

in a tiltable manner against machine frame 101, and lifting frame 103 vertically reciprocable along inclined frame 102. Inclined frame 102 is so installed that its left rear corner facing the front may be lowered through tilting support means 104 consisting of a tilting support shaft inserted in between the lower end of this frame and machine frame 101. Inclined frame 102 can be set in a tilted position or standing up position by tilting drive means 105 consisting of a motor, cam, etc., to be driven by control signal from the central control unit.

On the inner surfaces of side plates on the left side and back side of inclined frame 102, vibration plates 106 are fitted respectively at the position of loading level A, and are vibrated respectively by a vibrating mechanism 107 such as motor in a small stroke toward the loading face. Moreover, said lifting frame 103 is suspended through a lifting mechanism 7 (refer to FIG. 7). On the horizontally bridged rod 113 of lifting frame 103 on which multiple number of forked rods 112 are installed, two sets of bearing rollers 701 are fitted opposite to each other in a freely turnable manner. On the back plate of said inclined frame 102, a pair of guide rails 702 are fixed longitudinally parallel to each other at the position corresponding to the fitted

position of said bearing roller 701. Flanged portions 701a formed on the outer periphery of each bearing roller 701 are fitted facing each other in a freely slidable manner so as to engage with the shoulder of said guide rail 702 of rectangular section, thus controlling the movements of lifting frame 103 in the depth and width directions. The numerals 114 denote longitudinally bridged frames fixed on both sides of said horizontally bridged frame 113. These two frames 114 are suspended by separate chains 703, 704 at their front and rear side ends, respectively, and suspended through support chain wheels 705, 706 fitted in a freely turnable manner on the side wall of inclined frame 102 perpendicularly above them. Chains 703, 704 passing through these support chain wheels 705, 706 are passed through an intermediate chain wheel 707 provided with two sets of gears and then engaged with each gear of one of drive chain wheels 709 fitted on both ends of drive shaft 708 bridged in a freely turnable manner between rear upper ends of two side walls of inclined frame 102 so that their free ends 703a, 704a may be suspended from said drive chain wheel 709, respectively. On the other drive chain wheel 709 fitted to said drive shaft 708, one set of chains provided on the other side of lifting frame 103 is set so as to suspend lifting frame 103. Moreover, motor 710 for rotary

driving is connected rotationally to one end of said drive shaft 708. Turning of said motor 710 in normal or reverse direction causes said drive chain wheels 709 fitted to drive shaft 708 to turn synchronously with the result that four pieces chains 703, 704 are moved by the same stroke to move lifting frame 103 up or down in parallel.

At the paper loading level A of said inclined frame 102, a paper position detection sensor (not shown) is provided. This sensor serves to control and stop the normal or reverse turning of said motor 710 for rotary drive through the central control unit in such manner as to ensure that the upper surface of paper a loaded on lifting frame 103 may always be kept at the level A. Further, the forked rods 112 of said lifting frame 103 are fitted at their base to horizontally bridged rod 113 in such manner that the sliding position is adjustable, thus ensuring that pallet b may be placed on the upper surface of said forked rods 112 for use.

Said paper feed rack 2 is, as is shown in FIG. 8, composed of machine frame 201 and lifting frame 202 to constitute a paper loading frame of front-open type, and is arranged inwardly toward the front at the position adjacent to said paper arranging device 1. Lifting frame 202 is suspended

and supported through lifting mechanism 7 (shown by the same numeral) similar to lifting mechanism 7 for said paper arranging device 1, and is driven by normal or reverse turning of motor 710 for rotary drive to go up or down. At the paper feed level B of said machine frame 201, a paper position detection sensor (not shown) is provided. This sensor serves to control and stop the normal or reverse turning of said motor 710 for rotary drive through the central control unit in such manner as to ensure that the upper surface of paper a loaded on lifting frame 202 may always be kept at the level B. Also in said lifting frame 202, likewise the case of said paper arranging device 1, a plurality of forked rods 206 extending forwardly to horizontal rod 205 bridged transversely over the rear end of the frame are fitted at their bases to said horizontal rod 205 in such manner as to permit the adjustment of sliding, thus ensuring that paper a may be loaded through paper loading plate 207 onto pallet b placed on the upper surface of said forked rods 206.

Said bridge plate device 3 is, as is shown in FIG. 9 and FIG. 10, installed between the top ends of paper arranging device 1 and paper feed rack 2, and is composed of main plate 301 and sub-plate 302 bridged so as to be slightly higher in level than the paper feed level B of paper feed rack 2 and the

loading level A of paper arranging device, respectively, and paper feed roller 303. Sub-plate 302 can be freely housed beneath the bottom surface of main plate 301, which is fixed to machine frame 201 of paper feed rack 2, and is pivotably fitted by means of rocking arm 305. Said sub-plate is so designed that it may be moved forwardly or backwardly from the end of the paper arranging device 1 by drive mechanism 304, composed of a rocking means such as a cam mechanism provided at the pivoted portion of said rocking arm 305 and a driving means such as a motor. Said main plate 301 and sub-plate 302 are fan-shaped in a plane figure and constitute a fan angle corresponding to the inward arrangement of the partially surrounding paper arranging device 1 and paper feed rack 2. Moreover, on the surface of main plate 301 on the side of paper feed rack 2, paper feed rollers 303 having an axis of rotation along the generating line of fan angle are provided in such manner that their partially cylindrical peripheries may be exposed from paper feed level 305, and are driven rotationally by motor 306 in the paper feed direction (Arrow C). The sliding surface of said paper feed roller 303 is made of soft synthetic resin. On the bottom surface of said sub plate 302, paper keeping mechanism 307 for pressing and keeping the upperfront side end of paper a, fed to paper arranging device 1 according to the timing of paper feed, is

provided.

Reversing paper feed device 4 is installed above the bridge plate device 3, and consists of reversing shaft 403 bridged across the paper feed line of said bridge plate device 3 and fitted in a freely turnable and cantilevered manner to cantilevered bearing piece 402 protrudingly fitted to machine frame 201 of said paper feed rack 2 or fixed to support frame 401 installed on the floor level. Said reversing shaft 403 forms a gently conical roll 404 larger in diameter on the supported side and gradually smaller in diameter on the non-supported end side, is bridged 10 to 20 cm above the sliding surface of bridge plate device 3 and is driven rotationally by motor 405 fixed to said support frame 401 at a proper speed in the reverse direction (Arrow D) to the paper feed direction (Arrow C) on said bridge plate device 3. The numeral 406 denotes a keep disk pivotably fitted above the approximate axial center of said roll 404. This keep disk is pivotably mounted at one end to the support frame 401 through means of a pin shaft 407 and mounted in a freely pivotable manner to the top end of support shaft 408 bridged freely reciprocally in the direction of Arrow E.

Keep disk 406 is thus brought into or out of contact with the periphery of roll 404 by means of the cam member 409, provided at the base of said support shaft 408, and the elasticity of coil spring 410. Said cam member 409 is mounted upon the motor shaft of control motor 411 fixed on the support frame 401, and serves to move said keep disk 406 toward and away from the periphery of roll 404 according to the timing of the detection of paper a by a paper detection sensor 413 to be hereinafter described. The numeral 412 denotes a sensor supporting bar bridged close to and in parallel with said reversing shaft 403 and on the side of paper arranging device 1. At the end of said bar 412, paper detection sensor 413, consisting a pair of light emitting/receiving elements, is provided so as to detect the end of paper a going beyond the upper side of said roll 404 and toward the side of paper arranging device 1 at the position indicated by Arrow F. When said paper detection sensor 413 detects the paper end, control motor 411 is driven to remove the constraint on support shaft 408 via cam member 409 such that support shaft 408, presses keep disk 406 against the surface of roll 404.

Plate holder 5 is, as is shown in FIG. 11, composed of machine frame 501 and lifting frame 502 so as to constitute a

loading frame of the front-open type for paper loading plates and is positioned closed to and along the side of the paper feed rack 2. Lifting frame 502 is suspended and supported through lifting mechanism 7 (shown by the same numeral) similar to the lifting mechanism for the paper arranging device 1, and is driven by normal or reverse turning of motor 710 such that frame 502 will go up or down. It is mounted upon and supported in a freely slidable manner within guide frame 503 provided on machine frame 501 and is linked with lifting chain 504 routed around the machine frame 501 so as to drive said lifting chain 504 by lifting motor 505. At the upper end of said machine frame 501, a paper loading plate position detection sensor (not shown) is provided. This sensor serves to control and stop the normal or reverse turning of rotary drive motor 710 for said lifting frame 502 through the central control unit in such manner as to ensure that the top side of paper loading plate loaded on said lifting frame 502 may always be kept almost at a predetermined level. 506 denotes a guide roller bridged transversely in a freely turnable manner at the top end of machine frame 501 on the side of paper feed rack 2. This roller is so constructed that paper loading plate b loaded on paper feed rack 2 may be slid onto lifting frame 103 in machine frame 501.

Further, working platform 6 is, as is clear from its main construction shown in FIG. 12, such that rotary shaft 602, connected to one end of platform plate 601 fitted on bearing piece 604 provided on the top end of base 603 fixed on the floor at a position adjacent to and in front of a paper feed rack 2 and paper arranging device in such manner as to be freely movable in the direction of Arrow G, while the end of arm 605 protruding transversely from the rotary shaft 602 is connected to crank mechanism 607 which is, in turn, connected to the drive shaft of platform plate kickup motor 606. The platform plate 601 is positioned in front of paper arranging device 1 and paper feed rack 2 and is turned down sideways so as to keep the platform at the level where optimal working height may be secured for the loading level A. Further, said rotary shaft 602 is inclined with respect to the floor level, and the edge of plate 601 is tilted toward the front side of the machine frame of the device when platform plate 601 is disposed vertically, thus resulting in its removal from the front of paper arranging device 1, paper feed rack 2 and plate holder 5.

8 denotes a de-aeration mechanism provided on the upper end of paper arranging device, 1.

In this mechanism, thrust shaft 802 is fitted in a freely

slidable manner to thrust bearing 801 fixed on the upper end of inclined frame 102, and roller shaft 804 is fitted in a freely turnable manner and protruding in a T-shape so as to intersect said thrust shaft 802 through bearing piece 803 fitted to the top end of said thrust shaft 802. To said roller shaft 804, rollers 805 are fitted in a freely turnable manner. Said thrust shaft 802 is driven by de-aeration mechanism drive unit 806 such as air cylinder or motor so as to slide in the direction of Arrow H.

9 denotes a mirror for checking the back side of loaded paper installed in the rear of paper feed level B of paper feed rack 2.

The paper arranging system of the above-mentioned structure is to load a bundle of paper sheets a to be stacked onto paper feed rack 2 through paper loading plate b and spacer block c onto lifting frame 202. Such loading can be done by adjusting the space between forked rods 112 and inserting a fork lift for loading in between said forked rods 112. When paper is loaded on lifting frame 202 of paper feed rack 2, rotary drive motor 204 for lifting is driven so as to ensure that the top side of paper may be kept at the paper

feed level B. On the other hand, paper arranging device 1 is waiting in the state where inclined frame 102 is inclined backwardly by tilting drive means 105 while lifting frame 103 is lifted up to the upper limit.

With platform plate 601 of working platform 6 turned down sideways from a vertical upright state by driving platform plate kickup motor 606, the worker goes on the working platform to perform re-loading of paper bundle a.

In the case where paper bundle a is to be loaded in a normal position from paper feed rack 2 onto paper arranging device 1, paper bundle a is moved from the paper feed level B of paper feed rack 2 onto bridge plate device 3 (at this time, paper bundle a will pass under reversing shaft 403) and is slid over said bridge plate device 3 to the paper feed level A of paper arranging device 1. By repeating this operation, stacking of paper sheets can be performed.

On the other hand, reversed paper stacking work is performed in the state of reversing shaft 403 being rotationally driven by motor 405. In this case, keep disk 406 is disposed at the position spaced apart and backward from the periphery of roll 404. First, a proper amount of paper bundle a is moved from the paper feed level B of paper feed rack 2 onto bridge plate device 3 (at this time, paper bundle a will

pass under roll 404) and is placed tentatively at the position where the tail end of paper bundle a does not pass through reversing shaft 403. Then, the trailing end of said paper bundle a is lifted up and wound around roll 404 in the rotating direction of said roll 404. At the same time, the trailing end of the paper bundle a is guided onto the bridge plate device 3. Also by this winding operation, paper bundle a is tail-sliding on the surface of roll 404, but paper detection sensor 413 detects the end of paper a going beyond the upper side of said roll 404 near to the side of paper arranging device 1. By this detection output, cam member 409 is rotationally driven by control motor 411 through the central control unit so as to ensure that keep disk 406 may be lowered down onto the surface of roll 404. Therefore, since said keep disk 406 serves to press paper bundle a wound around roll 404 against the surface of said roll 404 by the elasticity of coil spring 410, said paper bundle a is rolled in and moved as reversing shaft 403 turns, and is slid over said bridge plate device 3 and thus automatically fed in a reversed state into the paper level A of paper arranging device 1. Upon complete movement of paper bundle a, there is no detection signal given by paper detection sensor 413. Then, control motor 411 drives cam piece 409 to act again on the base of support shaft 408, thus

causing keep disk 406 to move away from the surface of roll 404. By repeating this operation, paper a can be fed in a reversed state into paper arranging device 1 for the purpose of stacking.

Paper a loaded on paper arranging device 1 is gradually lowered by lifting frame 103 while it is kept at the level A.

Paper loading plate b discharged from paper feed rack 2 by said stacking operation is removed through guide roller 506 onto lifting frame 103 of plate holder 5.

Moreover, since the worker can, during said re-loading operation, check the back side of paper reflected in mirror 9 for checking the back side of loaded paper installed in the rear of paper feed level B of paper feed rack 2, he can check and remove the tag showing the position of wrinkled or broken paper.

In the case when the re-loaded paper is to be carried out from paper arranging device 1 after completion of paper stacking work, platform plate 601 of working platform 6 is driven by platform plate kickup motor 606 to its vertical position, whereby working platform 6 is removed from the front of paper arranging device 1. In this state, a forklift is slid inbetween forked rods 112 under lifting frame 103 of

paper arranging device 1 to complete the whole process of work.

While the invention has been particularly described with reference to its most preferred embodiment, it will be apparent that various other modifications and changes may be made to the present invention described above without departing from the spirit and scope thereof. Therefore, the present invention is not limited only to its particular embodiments.



M&C FOLIO: 230P59037

WANGDOC: 2970p

Claims

1. A paper arranging system comprising:

a paper feed rack for initially receiving a bundle of paper sheets;

a paper arranging device located adjacent to said paper feed rack for receiving and stacking the bundle of paper sheets after the bundle has been transferred from the paper feed rack to the paper arranging device, the paper arranging device incorporating a vibration plate on an inner wall thereof, driven by a vibrating mechanism, so as to uniformly align at least two sides of the paper sheets and a corner defined therebetween;

means for assisting conveyance of the paper sheets from the paper feed rack to the paper arranging device; and

a working platform disposed in front of the paper feed rack and the paper arranging device, said platform being pivotable between a horizontal position, at which an operator may be supported thereon for performance of a paper re-loading operation, and a vertical position at which the platform is moved away from the front of the paper feed rack and paper arranging device, means being provided for movement of the platform between the horizontal and vertical positions.

2. A paper arranging system according to Claim 1 wherein the paper arranging device and the paper rack are placed at an angle with respect to one another.



3. A paper arranging system according to Claim 1 or Claim 2, further comprising a paper loading plate holder adjacent to the paper feed rack and a lifting frame, disposed within the plate holder for lifting and lowering paper loading plates.

4.. A paper arranging system according to any of Claims 1 to 3 wherein the paper arranging device constitutes a paper loading frame of front-open type consisting of a machine frame, an inclined frame supported in a tiltable manner on the machine frame, and a lifting frame vertically reciprocable along the inclined frame, the inclined frame arranged such that it may be set in a tilted position or a vertical position by action thereon of a tilting drive means.

5. A paper arranging system according to Claim 4 wherein the lifting frame comprises a transversely disposed support rod and a plurality of forwardly extending rods, slidably adjustable upon the transversely disposed support rod so as to adjust the spacing between adjacent forwardly extending rods, for supporting paper to be unloaded from the paper arranging device after stacking.

6. A paper arranging system according to any of Claims 1 to 5 wherein a mirror for checking the rear of the loaded paper is provided in the rear of the paper feed rack so as to verify the paper feed level of the paper stacked within the paper feed rack.

7. A paper arranging system according to any of Claims 1 to 6, wherein the means for assisting conveyance of the paper sheets from the paper feed rack to the paper arranging device comprises a bridge plate interposed between the paper feed rack and the paper arranging device, the bridge plate acting to support the paper sheets as they are



transferred, feed roller means being provided upon the bridge plate for moving the paper sheets on the plate from the paper feed rack towards the paper arranging device.

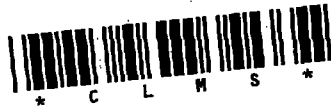
8. A paper arranging system according to Claim 7 wherein the bridge plate comprises a main plate and a sub-plate disposed beneath the main plate, means being provided for moving the sub-plate relative to the main plate so as to lengthen or shorten the bridge plate in order to bridge any distance defined between the paper feed rack and the paper arranging device.

9. A paper arranging system according to Claim 7 or Claim 8 further comprising a reversing mechanism for the paper arranging device placed above the bridge plate, such that the direction of the faces of the sheets of paper passing over the bridge can be reversed before reaching the paper arranging device.

10. A paper arranging system according to Claim 9 wherein the reversing mechanism comprises:

a roll set horizontally in a cantilevered manner, the roll being disposed above the bridge plate device so as to intersect the paper feed direction, the roll being rotationally driven by a suitable rotary drive unit in a direction opposite to the paper feed direction on the bridge plate; and

a keep disk set in such a manner with respect to the roll as to be freely pivotable into and out of contact with the surface of the roll, such that it may be pressed as a paper pressing means against the roll surface according to the timing of the paper feed to the roll, rotation of the roll while the paper is pressed



against the surface of the roll causing the paper to pass over the roll and return to the bridge plate facing in the reverse direction.

11. A paper arranging system according to Claim 10 wherein the roll has a gently conical shape.

12. A paper arranging system according to Claim 10 or Claim 11 wherein the keep disk is attached to the end of a support shaft in such a manner that the disk can rotate freely about the axis of the shaft, the shaft and keep disk being biased towards the roll by means of a spring attached to the shaft, the keep disk being pivoted into and out of contact with the surface of the roll by means of a cam, fitted to a control motor, which acts on the support shaft.

13. A paper arranging system substantially as described herein with reference to the accompanying drawings.
