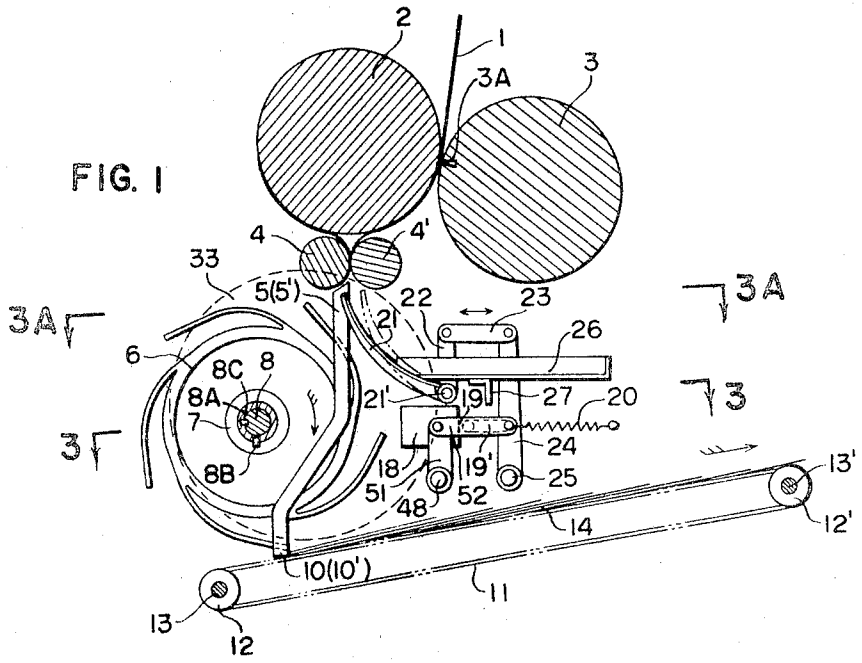
April 11, 1967 MASATOSI ISII 3,313,538

AUTOMATIC GUIDE-OUT FOR PRINTED PAPERS FROM A ROLLING PRESS

Filed Oct. 5, 1964 5 Sheets-Sheet 1

FIG. 1



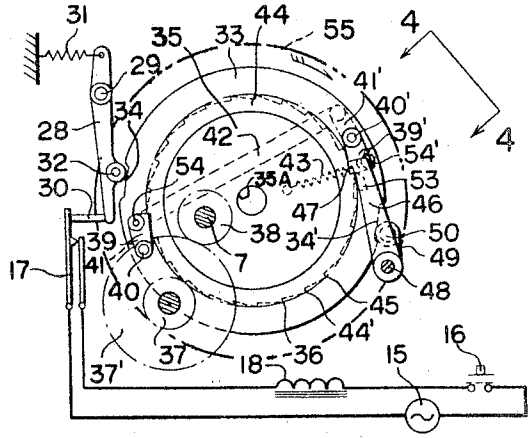


FIG. 2

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AUTOMATIC GUIDE-OUT FOR PRINTED PAPERS FROM A ROLLING PRESS

Filed Oct. 5, 1964 5 Sheets-Sheet 2

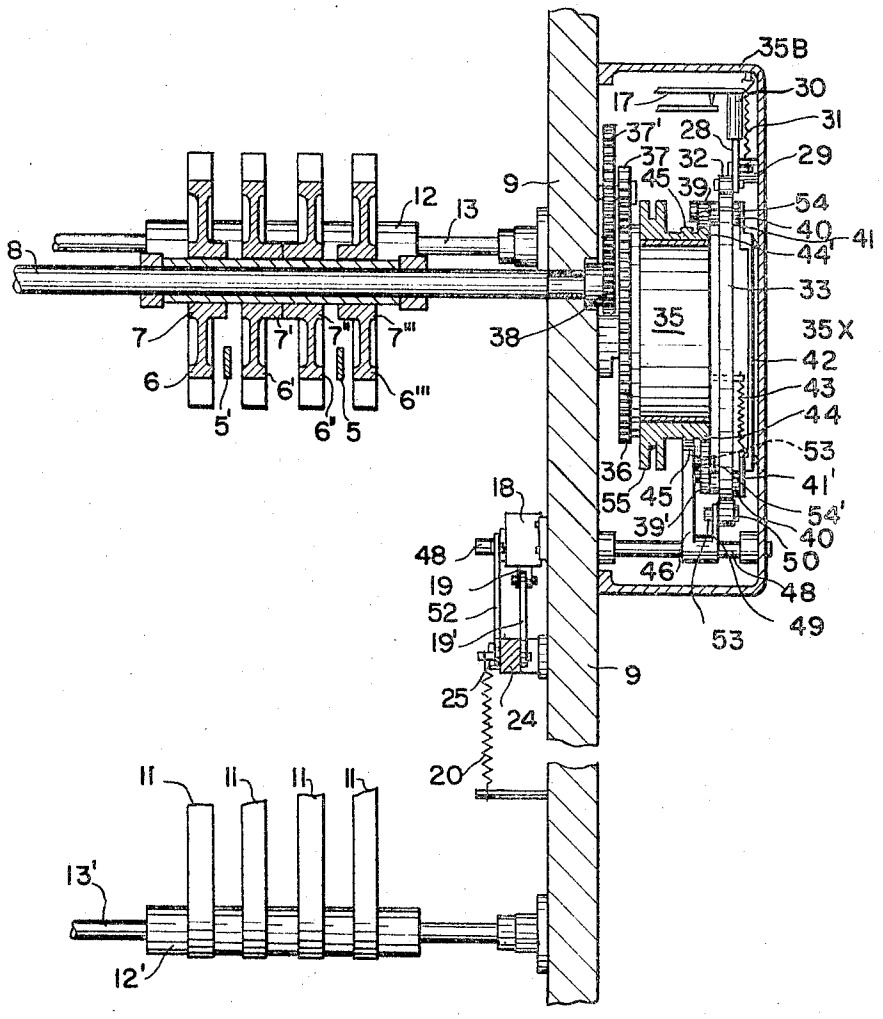


FIG. 3

April 11, 1967 MASATOSI ISII 3,313,538

AUTOMATIC GUIDE-OUT FOR PRINTED PAPERS FROM A ROLLING PRESS

Filed Oct. 5, 1964 5 Sheets-Sheet 3

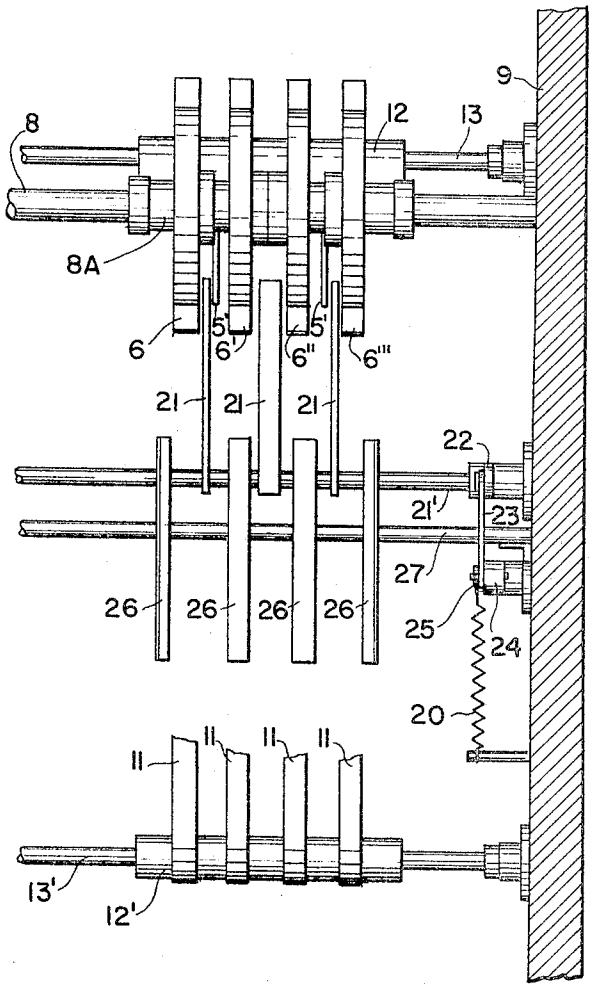


FIG. 3A

AUTOMATIC GUIDE-OUT FOR PRINTED PAPERS FROM A ROLLING PRESS

Filed Oct. 5, 1964 5 Sheets-Sheet 4

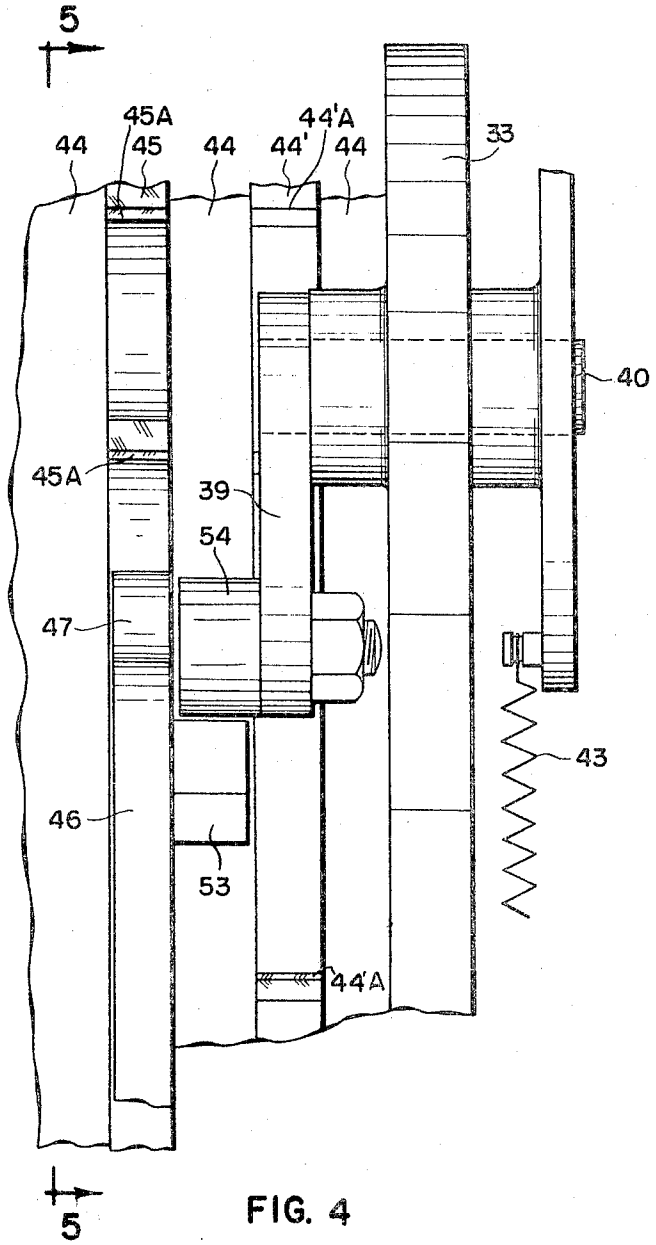


FIG. 4

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AUTOMATIC GUIDE-OUT FOR PRINTED PAPERS FROM A ROLLING PRESS

Filed Oct. 5, 1964 5 Sheets-Sheet 5

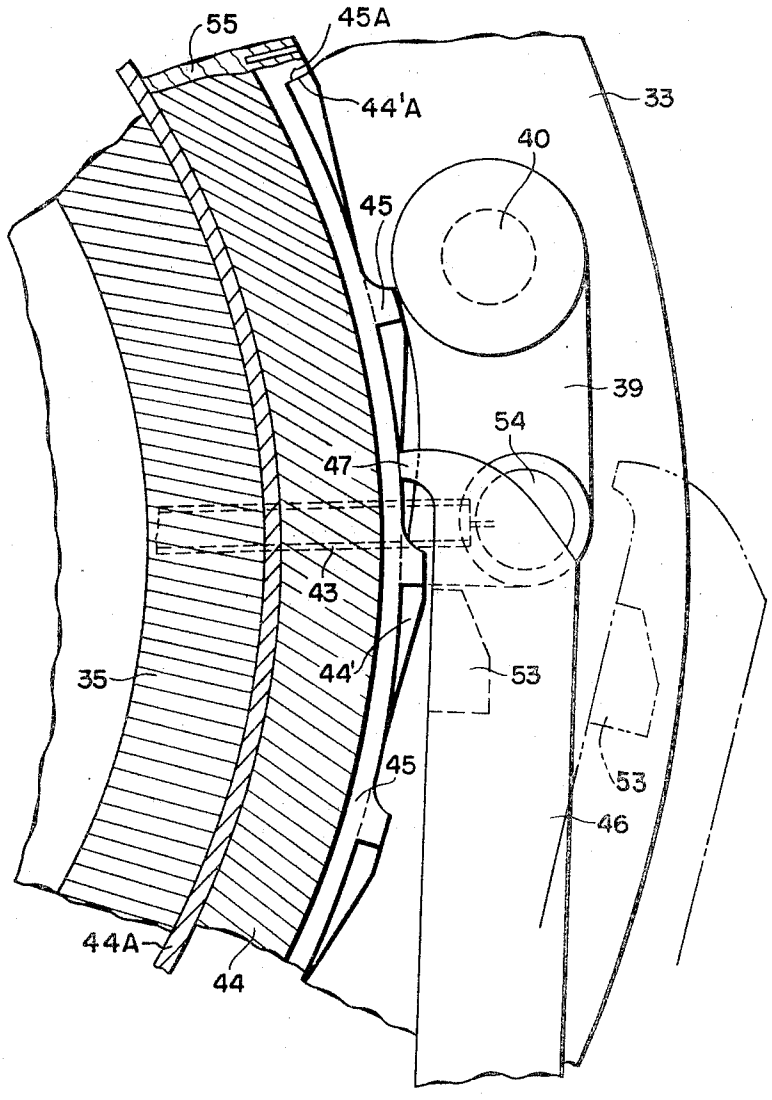


FIG. 5

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Patented Apr. 11, 1967

3,313,538

AUTOMATIC GUIDE-OUT FOR PRINTED PAPERS FROM A ROLLING PRESS

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Filed Oct. 5, 1964, Ser. No. 401,290
5 Claims. (Cl. 271—64)

The present invention relates to controlled inspection particularly of a finished printed and folded paper sheets to assure excellent quality of printing and to avoid shortages or excesses of any particular sheet.

Heretofore, it has been customary to pull out one or more printed sheets to inspect the quality of the printing and folding but there has not been an effective manner of determining the number of sheets removed for inspection and therefore it has been customary to print an excessively large number of sheets to assure that there are sufficient pages to make a complete publication and even with the excess numbers of sheets being printed, there have been shortages so that the total number of publications could not be made complete without reprinting some of the pages.

An object of the present invention is to provide automatic means which is controlled by the operator to remove a limited pre-determined number of sheets for inspection and simultaneously therewith to stop the operation of the counting mechanism so that the counting mechanism indicates the precise number of acceptable completed sheets for the publication.

An object of the present invention is to provide a machine adaptable for use with conventional printing and folding machines to remove a sheet for inspection and simultaneously correcting the count of the finished sheets to omit the sheet which has been removed for inspection.

A further object is to provide manually controlled means for removing a pre-determined limited number of sheets for inspection without interfering with the normal operation of the printing machine.

Another object is to provide an effective counting mechanism, which counting mechanism automatically compensates for removed articles.

Other and further objects will be apparent as the description proceeds and upon reference to the accompanyings wherein:

FIGURE 1 is a longitudinal vertical section of the apparatus including the folding cylinder, the cooperating cutting cylinder, the folding rolls, the vane wheels for receiving the folded material, the strippers for removing the folded material from the vane wheels, a conveyor for receiving the folded printed material, and the rockable guide out boards for removing selected folded sheets for inspection;

FIGURE 2 is a longitudinal vertical section showing the electrical control for the guide out boards and the cam and ratchet wheels with the cooperating pawls and stop for controlling the counting mechanism;

FIGURE 3 is a horizontal section taken substantially on line 3—3 of FIGURE 1 showing the vane wheels in section and showing the control mechanism of FIGURE 2 in plan with the ratchet wheel in section;

FIGURE 3*a* is a plan view taken substantially on line 3*a*—3*a* showing the vane wheels, the strippers, the guide out boards and the slat table for receiving the copies to be inspected;

FIGURE 4 is an enlarged fragmentary view taken substantially on line 4—4 of FIGURE 2 showing the operation of the pawl release and the stop arms;

FIGURE 5 is a section taken substantially along line 5—5 of FIGURE 4 showing the two ratchets on the ratchet wheel and the stop arm in ratchet wheel stopping position with the wedge-shaped cam element on the stop arm about to release the pawl from driving the ratchet wheel, and showing a fragment section of the counting cam which is in the foregoing to bring out the operative relation of the elements of the ratchet wheel.

Briefly the present invention includes a plurality of arcuate-shaped guide out broads adapted to extend into the path of folding rollers to remove selected folded sheets and such boards are mounted on a rock shaft which is moved in one direction by a solenoid and moved in the other direction by a cam through suitable linkages and the solenoid and cam are operated in timed relation in response to a manually operated switch and a cam operated limit switch cooperating with the cam to assure timed operation of the guide out boards to remove a limited number of articles only and immediately restore the machine to continuous operating condition.

The machine also includes a counting mechanism which counting mechanism automatically corrects for the sheets which have been removed by the guide out boards so that the operator of the machine can make sure that the proper number of completed sheets are produced in each instance for each section of the completed publication.

Referring more specifically to the drawings, a printed paper **1** is fed between folding cylinder **2**, cutting cylinder **3** with a knife **3A** severing the paper web **1** with the severed section of paper being fed to folding rollers **4**, **4'** which guide the paper after the cutting to the strippers **5**, **5'** which are arranged in upstanding relation between vane wheels **6**, **6'**, and **6''** and **6'''** of which vane wheels include hubs **7** keyed to shaft **8** through a bushing **8A** having a key **8B** to the hubs **7** and a key **8C** to the shaft **8**, it being apparent that the strippers are mounted on a suitable frame so that the upper free ends thereof extend closely adjacent the folding rollers **4**, **4'** and the mounting permits the unobstructed operation of the vane wheels **6** to **6'''**.

A frame **9**, of which a fragment is shown in FIGURES 3 and 3*a*, rotatably supports the shaft **8** and the other parts of the mechanism but such frame is omitted in the other figures for clarity. A conveyor **11** includes a plurality of belts passing around rolls **12** and **12'** rotatably mounted on shafts **13** and **13'** in a known manner with the conveyor positioned beneath the strippers and the vane wheels to receive the papers **14** in overlapping relation, as shown, with the direction of movement indicated by the arrow with other arrows shown in the drawings to indicate the direction of movement of other parts.

The automatic guide out mechanism includes parts shown in FIGURE 2 where a source of current **15** is connected in series with a manually operated switch **16**, a solenoid coil **18** and a cam actuated limit switch **17** with the solenoid plunger **19** being connected to a link **19'** as shown in FIGURE 3 which link **19'** is connected to an idler lever **24** which is pivotally mounted on the frame **9** by a pivot pin **25** with the idler lever **24** and the plunger **19** and the interconnected mechanism being biased in a direction to remove the plunger from the solenoid **18** by a spring **20** connected to the idler lever **24** and to a fixed portion of the frame **9**. The upper end of the idler lever **24** is connected by a link **23** to the upper end of a lever **22** fixed to a guide out boards rock shaft **21'** which fixedly supports the lower ends of the arcuate-shaped guide out boards **21** whereby when the solenoid **18** is operated the guide out boards **21** move to the full line position and a folded sheet of printed material passes along such guide out boards and is received on the slat table **26** which slat table is supported on the frame by cross-member **27**.

To operate the limit switch **17**, a switch operating lever **28** is pivoted at **29** and spring biased by tension spring **31** to a position permitting the switch **17** to close and such switch operating lever is provided with a roller follower **32** which engages a flange cam **33** of a cam wheel **35**

rotatably supported on a shaft 35A and such cam follower 32 may pass into one of the recesses 34 or 34' to permit the limit switch 17 to close but such limit switch may close only when the follower 32 is in one of the depressions and the solenoid 18 is only operated when the manual switch 16 is closed and the switch 17 is closed and therefore the guide out boards 21 are operated only when this condition exists and this condition exists for only two folded printed sheets since the gearing 36 to 38 which operates the cam wheel 35 is arranged so that fifty printed sheets pass through the folding rollers 4 and 4' for one complete revolution of the cam wheel 35, it being apparent that the cam wheel is positively driven by the gearing in timed relation to the folding cylinder, cutting cylinder, folding rolls and vane wheels by the gear 38 fixed to the shaft 8 of the vane wheels and connected by gearing 36, 37, 37' to the cam wheel 35.

Positioned on the inner surface of the cam flange 33 are opposed pawls 39, 39' fixed to stub shafts 40 and 40' respectively which stub shafts are pivotally mounted in the cam flange 33. An operating crank arm 41 extending in the same direction as pawl 39 is fixed to stub shaft 40 outside of the flange 33. An operating crank arm 41' extending in the opposite direction to pawl 39' is fixed to the stub shaft 40' outside of the cam flange 33. The free ends of the crank arms 41 and 41' are connected by a link 42 so that the pawls 39 and 39' operate simultaneously and such pawls carry follower rollers 54, 54', respectively, which engage a cam element 53 hereinafter described.

A ratchet wheel 44 is rotatably mounted by means of a bearing 44A on the drum portion of the cam wheel 35 and such ratchet wheel carries a first ratchet 44' which cooperates with pawls 39, 39' as such pawls are spring pressed by spring 43 into engagement with the first ratchet 44' and when such pawls are in engagement with the ratchet 44', the ratchet wheel moves in unison with the cam wheel 35 and this condition exists as long as the sheets are fed directly to the conveyor 11. A second ratchet 45 has its ratchet teeth arranged in opposed relation to the ratchet teeth of ratchet 44' but the engaging faces of the two ratchets lie in substantially the same angular position as shown in FIGURE 4 and in FIGURE 5 with the operative faces identified as 45A, 44'A. A stop arm 46 fixedly mounted on a rock shaft 48 which is rotatably mounted in suitable bearings in the frame 9 and the tip end 47 thereof is adapted to abut the abutment face 45A of the ratchet 45 to stop rotation of the ratchet wheel 44. A wedge-shaped cam element 53 projects outwardly from the upper end portion of the stop arm 46 and is adapted to engage the roller 54 or 54' on the pawls 39 and 39', respectively, to cause the pawls to move out of abutting relation with the abutment surface 44'A of the ratchet 44' thereby permitting the ratchet wheel 44 to remain stationary while the abutment surface 47 of the stop arm 46 engages the abutment surface 45A of the next adjacent tooth of the ratchet 45 to prevent rotation of the ratchet wheel 44. The stop arm 46 is normally in the dotted line position shown in FIGURE 5 and is held in this position by a cam follower arm 49 fixed to rock shaft 48 and fixed with respect to the stop arm 46 which follower arm 49 carries a roller 50 which engages the cam flange 33 and is adapted to be received in one of the recesses 34 or 34' so that the stop arm 46 can only engage the ratchet 45 when the roller 50 is received in one of the recesses.

A lever 51 is fixed on rock shaft 48 and is connected by a link 52 to an intermediate portion of the idler lever 24 whereby the guide out boards 41 are positively operated when the stop arm 46 is operated whether such operation is caused by the solenoid 18 to bring the guide out boards to the full line position or whether such operation is caused by the cam 50 leaving the recess 34 or 34' to cause the stop arm 46 to assume the phantom line position in FIGURE 5.

A counting cam 55 shown in FIGURE 3 is a fixed portion of the ratchet wheel and therefore makes one complete rotation upon the feeding of 50 sheets as explained above.

From the above description it is believed that the operation should be clear and that during a printing run when it is desired to remove two sheets for inspection, the operator presses the manual switch 16 and nothing happens until the cam flange 33 moves to a position so the recess 34 or 34' receives the follower roller 32 of the limit switch operating lever 28 to thereby permit the strut 30 to move to the full line position shown in FIGURE 2 where the limit switch 17 is closed, thereby closing the circuit from the electrical supply 15 to the solenoid 18 thereby causing the plunger 19 of the solenoid 18 to be drawn into the solenoid which can only happen when the roller 50 on the follower arm 49 fixed to the stop arm 46 and fixed to the rock shaft 48 is received in cam recess 34 or 34' so that the stop tip 47 may extend inwardly to the full line position of FIGURE 5 in the path of an abutment surface 45A of the next ratchet tooth of the ratchet 45 and approximately at the same time a cam follower roller 54 or 54' on the pawls 39 or 39' engage the wedge-shaped cam element 53 fixed to the stop arm 46 and such inter-engagement causes the pawl 39 to be moved out of abutment contact with the abutment surface 44'A of the ratchet wheel, 44', thereby unclutching the pawls from the ratchet wheel so that the pawls may move with the cam wheel 35 but the ratchet wheel remains stationary because of the abutment tip 47 engaging an abutment surface 45A of the next ratchet tooth. However, as soon as the end of the recess 34 or 34' is reached, the roller 50 causes the follower arm 49 and therefore the rock shaft 48 and the stop arm 46 to move away from the stopping position and by this time the roller 54 of the pawl 39 or 39' has passed the wedge-shaped cam element 53 and the pawl 39 or 39' is ready to re-engage with the next tooth of the ratchet 44' and this re-engagement of the ratchet pawl 39 or 39' with the ratchet tooth occurs after the feeding of two sheets to the guide out boards 21 and to the slat table 26 and the counting is resumed since the ratchet wheel again moves and therefore operates the counting cam 55 and consequently the counting mechanism has an accurate record of the number of sheets deposited on the conveyor 11 and the operator of the machine then knows how many sheets to add to the supply to come out with the precise number of completed sheets for completing the publication.

It will be apparent that changes may be made within the spirit of the invention as defined by the valid scope of the appended claims.

What is claimed is:

1. A printing machine comprising a frame cutting and folding cylinder rotatably mounted on said frame for cutting and folding printed web material, folding rollers in the path of folded sheets from said folding cylinder, an automatic folded sheet guide out device including a vane wheel shaft rotatably mounted on said frame, a plurality of vane wheels fixed to said shaft for receiving printed folded sheets, upstanding strippers positioned between said vane wheels and mounted on said frame for engaging said folded sheets to remove said sheets from said vane wheels, a conveyor beneath said vane wheels and beneath said strippers for receiving said folded sheets, a flanged drum cam wheel rotatably mounted on an axis parallel with said vane wheel shaft, the cam flange having a pair of diametrically disposed recesses, a ratchet wheel rotatably mounted on said drum first and second ratchets on said ratchet wheel, the teeth of the first ratchet being opposed to the teeth of the second ratchet, a pair of diametrically disposed pawls pivotally mounted on said cam flange and engageable with the teeth of the first ratchet for causing said ratchet wheel to rotate in the same direction as said cam wheel, a link connecting said pawls of said first ratchet to cause simultaneous operation

thereof, cam followers on said pawls for cooperation with a lifting cam element to cause separation of said pawls from said first ratchet, a rock shaft rockably mounted on said frame, a stop arm fixed on said rock shaft, a wedge-shaped cam element on said stop arm for cooperation with the followers on said pawls to move said pawls out of engagement with said first ratchet, a cam follower lever fixed on said rock shaft, a roller on said cam follower lever for reception in said recesses in said cam flange whereby said cam normally holds said stop arm out of engagement with said second ratchet, a spring biased normally closed electrical switch mounted on said frame, a switch operating cam follower lever pivotally mounted on said frame to operate said switch to permit said switch to close when the follower thereof engages a recess in said cam flange, a manual switch, a solenoid and a source of power in series with said cam operated switch whereby said solenoid will operate when said manual switch and said cam follower switch are closed, a lever fixed on said rock shaft, an idler lever pivotally mounted on said frame, a link extending from said lever on said rock shaft to said idler lever, a link interconnecting an intermediate point on said idler lever to the plunger of said solenoid, a spring normally opposing said solenoid plunger to move said levers to inoperative positions, a guide out boards supporting rock shaft mounted on said frame, a plurality of guide out boards fixed on said guide out boards supporting rock shaft and extending toward said vane wheels and adapted to extend between the vanes of said vane wheels and between said strippers in operative position to remove sheets and movable away from said vane wheels and said strippers to inoperative position to permit sheets to be deposited on said conveyor, a lever fixed on said guide out boards rock shaft, a link interconnecting said idler lever and said lever on said guide out boards rock shaft whereby upon rocking of said idler lever by said solenoid plunger said guide out boards will move into operative position and upon operation by said cam flange said guide out boards will be moved to inoperative position, and means operable by said ratchet wheel to count the number of printed sheets received on said conveyor whereby the precise number of complete printed sheets may be known so that additional sheets may be printed to obtain the desired total.

2. An automatic guide out device for printing machines having a frame with cooperating cutting and platen cylinders and folding rollers downwardly extending strippers, vane wheels on each side of said strippers for receiving the folded papers, the improvement comprising a cam driven in timed relation to said vane wheels, a limit switch operable by said cam, a manual switch, a source of power and a solenoid in series with said limit switch, guide out boards adapted to be received between said strippers and vane wheels, a rock shaft supporting said guide out boards, a lever fixed to said rock shaft, link means between the plunger of said rock shaft, and cam means to move said guide out boards in one direction, said solenoid serving to move said guide out boards in the other direction.

3. An automatic sheet guide out device comprising a frame, a plurality of vane wheels fixed to a shaft rotatably mounted in said frame for receiving sheets, strippers positioned between said vane wheels for engaging said sheets to remove said sheets from said vane wheels, a conveyor for receiving said sheets, a guide out boards supporting rock shaft mounted on said frame, a plurality of guide out boards fixed on said rock shaft and extending toward said vane wheels and adapted to extend between the vanes of said vane wheels and between said strippers in operative position to remove sheets and movable away from said vane wheels and said strippers to inoperative position to permit sheets to be deposited on said conveyor, and manually controlled means to cause said guide out boards to move to operative position to guide out a predetermined limited number of sheets only and to then return to inoperative position.

4. The invention according to claim 3 in which means are provided to count the number of sheets only fed to said conveyor.

5. Mechanism for operating a rock shaft for a limited time comprising a cam wheel, means to rotate the cam wheel in timed relation, a cam on said cam wheel, a ratchet wheel rotatably mounted on said cam wheel, a ratchet clutching means operable between said ratchet wheel and said cam wheel and supported on said cam wheel to rotate said ratchet wheel, stop means mounted on said rock shaft to prevent rotation of said ratchet wheel, interconnecting means between said stop means and said clutching means whereby said clutching means is released only after said stop means is in operative position causing said clutch to be released, means on said cam to restore said stop means to inoperative position, and means to move said rock shaft and said stop means into operative position at selected times only controlled by said cam.

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BERNARD STICKNEY, *Primary Examiner.*