This invention relates to delivery mechanism for printing and like machines.

It is an object of the present invention to provide means for automatically indicating to the operator those copies which have been spolit in changing over from one type cylinder of the "non-stop" unit to the other, so that the operator may readily distinguish spolit and unspolit copies and remove the spolit copies with certainty.

Another object of the invention resides in the provision of means by which spolit copies may be readily distinguished from "count" copies.

Other objects and advantages of the invention will be clear from the following description, reference being made therein to the annexed drawings.

In said drawings:
Fig. 1 is a side elevation of a rotary or S fly, designed for handling newspaper and fitted with one embodiment of spolit copy indicating means of this invention;
Fig. 2 is a plan view of Fig. 1 showing in addition a conventional arrangement for displacing "count" copies;
Fig. 3 is a diagrammatic view illustrating the relative positions on a delivery conveyor leading from the fly of unspolit, spolit and count copies;
Fig. 4 is a detail view illustrating a modified arrangement having means for mechanically introducing a time lag in the operation of the spolit copy indicating means; and
Fig. 5 is a side elevation of another embodiment in which the spolit copies are completely separated from the unspolit copies prior to reaching the delivery conveyor.

In the use of "non-stop" printing mechanism such as is employed in printing machines for adding late news, edition headings or other matter to newspapers without stopping the machine, it is usual for such mechanism to include an impression cylinder and two type cylinders or sets of type cylinders either of which may be placed in impression contact with the impression cylinder while the other is out of impression contact, these two type cylinders or sets of type cylinders being employed alternately when changes are to be made in the late news or other matter and the inoperative type cylinder being stationary in readiness to receive a new plate or plates. During the operation of changing over from one type cylinder or set of type cylinders to the other, which involves relative movement of the type and impression cylinders, some copies are necessarily spolit and it has hitherto been the practice, in view of the impossibility of determining which of those copies deposited on the delivery conveyor customarily provided for transferring printed copies from the printing machine to a stacker are waste copies, for the operator to remove a number of copies from the conveyor belts and examine the printed portion affected by the change.

In accordance with the invention, a delivery mechanism for printing presses fitted with late news or like mechanism comprises a rotary or S fly having stripper means for depositing the copies carried thereby on a delivery conveyor and means operable in timed relation with a change in the operation in late news or like mechanism for deflecting the spolit or waste copies relative to the unspolit copies.

Deflection of spolit or waste copies may take the form of an angular offsetting or displacement of such copies relative to the unspolit copies on the delivery conveyor leading from the fly. Alternatively, such deflection may involve the complete separation of the spolit from the unspolit copies prior to reaching the delivery conveyor, the spolit copies being deflected onto a different conveyor from that on which the unspolit copies are deposited.

The spolit copy deflecting means may comprise a lever or "kicker" rockably mounted adjacent the fly and having its free end normally positioned out of the path of the copies on the fly. The lever may be actuated by a solenoid connected thereto, the solenoid circuit being automatically closed to move the free end of the lever into the path of the copies in the fly following relative movement between the impression cylinder and the operative type cylinder, and being automatically broken to return the lever to its normal position upon contact being established between the impression cylinder and the other type cylinder.

In order that all spolit copies but no unspolit copies shall be deflected by the kicker lever, means are preferably provided for introducing a time lag in the operation of the solenoid controlling said lever, so that all unspolit copies between the printing position and the fly will be unaffected by the lever, the latter taking up its operative position only when said unspolit copies have been discharged from the fly; similarly, this time lag is again operative on completion of the changeover of the type cylinders, whereby the lever is caused to maintain its operative position until all spolit copies have been discharged from the fly, the lever then automatically resuming its inoperative position. Provision is preferably made for varying the time...
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lag in the actuation of the kicker lever in accordance with the speed of the press.

In delivery mechanism of printing machines it is customary to employ means for counting the printed copies discharged by the fly on to the delivery conveyor, such means usually comprising a kicker lever which is actuated under control of a counting device to displace selected copies, for example, the last copy of each quire, relatively to the other copies. In order that "count" and spoil copies when the latter are deposited on the delivery conveyor, may be readily distinguished, it is preferable to arrange the "count" and spoil copies at opposite sides of the fly and the spool copy kicker lever at the opposite side of the "count" and spoil copies thus being deflected in opposite directions. The arrangement is preferably such that the "count" mechanism is rendered inoperative as long as the spoil copy means is operative, thereby ensuring that all spoil copies are automatically eliminated from the count.

Referring now to the drawings and firstly to Figs. 1 and 2 thereof, a conventional form of rotary fly 5 is shown comprising a plurality of coaxially aligned, spaced discs 10 secured for rotation therewith on a shaft 11 (journalled in bearings (not shown) in the press frame). The fly is driven at the desired speed from the press through any suitable gearing including a gear 12 secured to the shaft 11. Each of the discs 10 has peripherally secured thereon in any appropriate manner a plurality of circumferential arcuate blades 13 between which and the discs the copies fed to the fly from the folding and severing mechanism of the press are held prior to deposition on a conveyor belt or belts 14 by which said copies are transferred to a stacker.

It is customary with fly mechanism of this kind for the copies, as shown in Fig. 1, to have their folded edges between the discs and the blades and, for the purpose of stripping the copies from the fly as they reach the desired position in relation to the conveyor belt, these folded, leading edges are caused to abut a pair of fixed, laterally aligned stops, one at each side of the fly and indicated diagrammatically at 15, 15 in Figures 1 and 2. Thus the copies, which are fed in a counter-clockwise direction as seen in Figure 1 until they engage the stops 15, are successively stripped from the fly and deposited on the conveyor 14.

Movement is imparted to the conveyor 14 in the direction of the arrow A in Figs. 1 and 3 so that the copies are deposited on the conveyor in successively overlapping relationship with their leading and trailing edges normal to the direction of travel of the conveyor. It is, however, also customary in newspaper and other printing machines to provide mechanism operating in association with the rotary fly to count the copies deposited on the conveyor, such mechanism operating to incline or deflect, for example, the last copy of each quire angularly with respect to the other copies. One known form of counting mechanism is illustrated in Fig. 2 and comprises a kicker lever 16 arranged above the conveyor 14 and adjacent one side thereof. This "count" kicker lever is adapted, by means which form no part of the present invention, in co-operation with appropriate counting trip mechanism, with the result that the last of any convenient number of copies deposited on the conveyor from the fly is angularly displaced as indicated at a in Fig. 3. The "count" kicker lever 16 is secured on a shaft 17 for rocking movement and normally occupies a position such that a stop portion 18 thereon is raised out of the path of the copies on the fly, while in the operating position the next copy to be deposited by the fly is engaged at one leading corner by the stop portion 18 of the lever 16 and, subsequently, at the other leading corner by the fixed stop 19 at the other side of the mechanism.

The means in accordance with the present invention for indicating to the operator those copies deposited on the conveyor which have been spoiled by changing from one type cylinder or set of cylinders of the "non-stop" mechanism to the other comprises a lever 20 which, as shown, may be similar to the lever 16 and is pivoted, for example, on the shaft 17 carrying said lever 16. Normally the stop portion 21 of the lever 20, which portion is located forwardly of the fixed stops 19, is raised, as by means of a spring 22, out of the path of the leading edges of the successive copies carried by the fly for depositing on the conveyor, while when the impression and, therefore, the cylinders are relatively moved to produce a change in the printed matter, the lever is lowered at the appropriate time to engage the spoil copies and cause them to assume an angularly offset position on the conveyor relative to the previously deposited unspoilt and "count" copies, as shown in b in Fig. 3.

The lever 20 is carried in a bracket 23 which is loose on the shaft 17 and to which is pivotally connected one end of the armature 24 of a solenoid 25 pivotally mounted at 26, the spring 22 being interposed under compression between the other end of said armature and a fixed abutment. The solenoid is arranged to be actuated to lower the stop portion 21 into operative position after a predetermined interval of time following commencement of the change from one type cylinder to the other. Thus the time occupied by copies leaving the "non-stop" unit, which may be required to travel some distance, in reaching the fly mechanism is compensated for so that all spoil copies but no unspoilt copies are angularly inclined on the conveyor. Thus time lag in the operation of the lever 20 may be effected electrically by the interposition in the circuit of the solenoid 25 of a slow-acting relay (not shown) of any known kind, by which immediate closing of the solenoid circuit is prevented. Alternatively, this slow-acting relay may, if desired, be replaced by a fluid dashpot which operates either on the lever or on a movable contact in the solenoid circuit. In either case the time lag may be adjusted to compensate for variations in the speed of the press.

The time lag in the operation of the lever 20 may, however, be produced mechanically. As shown in Fig. 1, the bracket 23 is formed with an elongated slot 27 within which rides a pin 28 secured to the solenoid armature. With the lever in the inoperative position shown in broken lines, the pin 28 is located near the lower end of the slot 27 and, on energization of the solenoid, rides along the slot until it engages the upper end thereof. Thereafter continued movement of the solenoid armature rocks the lever 20 into the full line position to locate the stop portion 21 thereof in the path of the copies on the
fly and the time occupied by these idle and operative movements corresponds to that taken by the first spool copy leaving the "non-stop" printing mechanism to reach stripping position on the fly. When the change has been completed and the solenoid de-energized, the spring 22 returns the pin 28 to the lower end of the slot 27, this being an idle movement substantially corresponding in duration to the idle movement in the opposite direction, and continued movement of the armature then raises the lever 20 into the inoperative position, by which time the first of the following unspolt copies fed to the fly in a position to be stripped therefrom.

The slot 27 may, as shown, be of fixed length but its length is preferably variable to compensate for variations in the speed of the press as by means, for example, of an adjustable stop (not shown). The movement of the disc 30 and the stripper arm 20 is retarded in each direction of its movement. The retarding effect of this mechanism on the shaft 17 during its rotation may be controlled by varying the opposing pressure of the discs in any appropriate or convenient manner thereby varying the braking effort exerted by the discs 30 and 31 in opposition to the force developed by the solenoid armature 24.

Instead of deflecting the spool or waste copies so that they occupy, with relation to the unspolt copies, an angularly displaced position on the delivery conveyor, the spool copies may be separated entirely from the unspolt copies prior to reaching the fly. To this end as shown in Fig. 5, sheet guides 35 are provided between the fly and a pair of folding-off rollers 36, 37. Those sheet guides are carried by arms 38 secured to a rotatable shaft 39 journaled in the machine frame. Also secured to the shaft is a forked lever 40 which is coupled as by a pivotal connection 41 to a rod 42 slidable journaled in bearings 43, 44 on the machine frame. The rod 42 forms or is coupled to the armature of the solenoid 45 secured to a bracket 46 carrying the bearings 43, 44 this solenoid being arranged to actuate the rod and thereby move the sheet guides 35 between the operative position (shown in full lines) and the inoperative position (shown in broken lines) and vice versa, in timed relation to a change in the late news or other matter printed by the "non-stop" mechanism, thereby to ensure that all unspolt copies are fed to the fly whilst all spool copies are deflected away from the fly, as shown at y in Fig. 5. The extent of angular movement of the arms 38 and shaft 39 is determined by a pair of collars 47, 48 pinned on the rod 42 and respectively engageable with the bearings 43, 44. The spool copies thus deflected may be collected by another conveyor (not shown) moving for example, in the opposite direction to the conveyor 14.

When the solenoid is de-energized, the rod 42 will return the sheet guides 35 to the inoperative position under the action of a spring 49 coiled about said rod. The copies thereafter fed between the folding-off rollers 36, 37, being unaffected by the sheet guides, will follow the normal path to the fly and will be deposited on the conveyor in the normal manner. During this deflection of the spool copies, the conveyor 14 continues its travel, with the result that there will be a gap on the conveyor between the unspolt copies produced before the change at the non-stop mechanism and those produced after such change, said gap corresponding to the spool copies deflected by the guides 35. This gap will be noticed by the operator, who will thus be able to distinguish these copies produced before and after the change.

The solenoid 25 and 45 of the embodiments hereinbefore described is suitably connected in the control circuit of the electric motor by which relative movement of the type cylinder or impression cylinders of the "non-stop" unit is customarily effected. For example, where the impression cylinder of such unit is movable into and out of printing engagement with one or other of a pair of stationary type cylinders or sets of cylinders as described in British Patent Specification No. 1942, the solenoid is connected in the control circuit of the motor for moving said impression cylinder. It will be clear, therefore, that immediately relative movement of the type and impression cylinders to effect a change in the printed matter is initiated, the solenoid 25 is energized and, after a predetermined interval of time, the spring 22 will return the lever to the inoperative position. In the case of Fig. 5, similar delayed movement will be imparted to the arms 38 carrying the sheet guides.

The attention of the operator to the presence in the machine of spool copies resulting from a change in the matter printed by the "non-stop" mechanism may be ensured by means of visual or audible signalling means connected in the circuit of the solenoid 25 or 45.

What I claim and desire to secure by Letters Patent in the United States is:

In a delivery mechanism for a printing machine having a late news or like printing unit involving the spooling of certain copies, the combination with a rotary fly, a conveyor, stripper means and a count kicker lever adapted to position count copies on said conveyor in angular displacement relative to other copies thereon, of a further lever adapted to position spool copies on said conveyor in a position of angular displacement relative to unspolt copies opposite to said first mentioned angular displacement, said lever comprising a bracket, said bracket being formed with a slot therein, a solenoid adapted to be energized concurrently with a change in the operation of said late news or like unit, the armature of said solenoid being connected to said lever by a pin adapted to slide in said slot, and means of returning said armature to initial position upon said solenoid being de-energized, said armature being adapted to actuate said lever into and out of operative position by means of said pin operating against the respective end surfaces of said slot.

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