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PRINTING AND Duplicating Machine HAVING A TABLE
FOR SUPPORTING A STACK OF SHEETS
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PRINTING AND Duplicating MACHINE HAVING A TABLE FOR SUPPORTING A STACK OF SHEETS
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This invention relates to a printing and duplicating machine having a table for supporting a stack of sheets which can be fed to the machine and a supplementary table mounted on the machine frame for interfeeding additional sheets from a second stack whilst the machine continues to operate.

When printing or duplicating a number of copies, particularly when the printing or duplicating involves relatively short runs, such as a limited number of internal circulars or memoranda, it is often desirable to print extra copies of some other colour not contained in the usual stack of paper on the table. When using machines which lack a supplementary paper table such sheets are usually interleaved in the stack either before or after they have been printed. In order to eliminate the labour of manual interleaving supplementary paper, tables for such additional sheets have been used.

In conventional interfeeding tables of this particular kind the supplementary table itself or the sheets of paper on the supplementary table must be presented to the suckers of the feeder by hand accurately timed with reference to the printing or duplicating cycle of the machine to ensure that the lifting suckers will pick up the supplementary sheets and feed them to the machine for printing or duplicating. When the required number of supplementary sheets has been printed by the machine the supplementary table or the sheets resting thereon must again be withdrawn out of range of the lifting suckers at a precisely timed moment to ensure that feeding from the principal paper table will continue without a hitch.

In the case of low speed machines the manual operations of presenting and withdrawing the supplementary table, or the sheets resting thereon, to and from the feed means can be performed by persons who have had adequate practice. However, in high speed machines this is impossible. Any attempt at manual interfeeding results in faulty register, faulty printing, damaged sheets and a large number of rejects besides operational troubles during the printing process.

The object of the present invention is to provide a supplementary or additional table, preferably above the usual paper table, and to arrange this supplementary table in such a way that when the supplementary table has been moved into a preparatory position without regard to the position of the machine, the advancing of the supplementary table into position under the lifting suckers will be performed automatically at the precise moment required to synchronise with the operation of the machine, and that the withdrawal of the supplementary table from the lifting suckers of the feeder will likewise be automatically performed to synchronise with the printing cycle of the machine.

This is achieved by arranging for the suckers of the feeder to pick up a sheet optionally from the supplementary table or from the principal table according to the position of the supplementary table, without interruption of the normal printing rate of the machine.

The difficulties which arise when hand feeding supplementary sheets are thus overcome and the supplementary sheets are reliably fed in proper register even in high speed machines.

According to the invention the supplementary table which carries the stack of supplementary sheets, and which is mounted on the frame of the machine for interfeeding the supplementary sheets, is associated with a control lever, preferably a manually operable lever, which permits cam elements attached to a slide rail to be displaced in relation to entraining means which reciprocate on the slide rail in synchronism with the operational cycle of the machine, and which are adapted to entrain the supplementary table, the position of the control lever and the consequent position of the cams causing the entraining means to be coupled with or to release the supplementary table and the supplementary table with the supplementary sheets to be moved into feeding or retracted position in relation to the feed means of the machine, such as lifting suckers or grippers.

Moreover, according to the invention the supplementary table is reciprocably movable in the machine frame, approximately in paper feeding direction, on rollers, the slide rail which is mounted in the machine frame and which slidably carries the entraining means extending substantially parallel to the guide means of the table. The entraining means comprises two catches one of which functions as an entraining catch and the other as a locking catch according to the direction of table displacement.

The machine frame carries a special locking catch for retaining the supplementary paper table in the position of rest. It is also proposed that the supplementary table be slidable in a box-shaped frame which is detachably mounted in the frame of the printing machine.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

FIGURE 1 is a side elevation of an offset printing and duplicating machine equipped with a supplementary table;
FIGURE 2 is a side elevation of the supplementary table in retracted position, the actuating lever having been moved to the left;
FIGURE 3 is a side elevation of the supplementary table with the actuating lever in position for advancing the supplementary table;
FIGURE 4 is a side elevation of the supplementary table shown in FIGURE 3, but with the table in working position;
FIGURE 5 is a side elevation of the supplementary table, the control lever being in position for withdrawing the table, and
FIGURE 6 is a plan view of the supplementary table. The purpose of the supplementary table is to feed an alternative kind of paper not contained in the principal stack of paper to the printing machine during predetermined intervals of time whilst the machine continues to print and the normal sheets cease to be fed.

According to the invention there is provided a movable supplementary feeding table which is advanced to or
retracted from the lifting suckers by a linkage 2 to 5 driven by the printing and duplicating machine, according to whether a control lever 12 is placed into advancing or feeding position “E” or retracting position “A.”

The distance linkage derives its motion from a crank arm 2 which is fast on a single revolution shaft of the printing and duplicating machine. Linked to the crank arm 2 is a connecting rod 3 which in turn is pivotally attached to one arm 4 of a bellcrank lever 4, 4a fulcrummed at the forward end of the sliding rail 7 mounted in the supporting frame of the supplementary table 1. The sliding rail 7 is movable in the frame of the supplementary table 1 either towards or away from the printing machine and the lifting suckers 19.

At each end, the sliding chair 6 carries a movable catch 8 and 9 respectively urged downwards by springs. According to the position of rail 7 either catch 8 will be raised by a cam 10 mounted on rail 7 or catch 9 will be raised by a cam 11 on the other end of rail 7 when the chair 6 reaches the relative end of its stroke.

The slidable displacement of rail 7 and of its cams 10 (at the end remote from the printing machine) and 11 (at the end adjacent to the printing machine) is effected by a manually operable lever 10. This hand lever 12 is fulcrumed on the supporting frame of the supplementary table 1. When lever 12 is in position “A,” i.e., in retract position, a rod 13 lowers one arm 24 of a bellcrank lever 14, 15 fulcrummed on the underframe of the supplementary table 1. Arm 15 of the bellcrank lever will then pull the sliding rail 7 towards the printing machine. Cam 10 on that end of rail 7 which is remote from the printing machine will thus be moved into the range of reciprocity of the sliding chair 6 which is moved to and fro by the single revolution shaft, and catch 8 will thus be raised by cam 10.

The other catch 9 at the end of the sliding chair 6 facing the machine will not strike cam 11 which, being fast on the sliding rail, was moved out of range of the sliding chair when the rail was displaced. However, catch 9 will engage the front face of a slot 19 which is fixed to the supplementary table. Moreover, when lever 12 is in position “A,” a safety catch 18 on the frame of the supplementary table 1 is deflected by a pin on lever arm 15. This safety catch 18 also engages a stop on the supplementary table 1 and the table from lifting suckers 19. Each side of the supplementary table is fitted with rails 17 which run on rollers 16 mounted on each side of the underframe. The table is thus adapted to run on the frame.

When lever 12 is deflected into position “E” (advancing or feeding position) bellcrank 14, 15 is tilted by rod 13 in the opposite direction, arm 15 of the bellcrank pushing the sliding rail 7 with its two cams 10 and 11 away from the machine. The stop pin on arm 15 deflects the safety catch 18 and dis-engages it from the stop at the forward end of table 1. The displacement of rail 7 moves out of range the rear catch 8 on the sliding chair 6 and this catch is therefore deflected by its spring into engagement with the rear face of the rear stop on the supplementary table 1.

When the sliding chair 6 is in its rearmost position the forward catch 9 on the sliding chair 6 is out of range of catch 9 engaged in front of supplementary table 1. The supplementary table 1 is thus held between the two catches 8 and 9 of sliding chair 6 and is carried forward as the sliding chair 6 moves towards the printing machine, the safety catch 18 being disengaged.

During this forward motion of sliding chair 6 and of the supplementary table 1 the leading catch 9 on the sliding chair 6 rides down cam 11 (at the forward end of the sliding rail 7) and the catch is therefore raised. The supplementary table 1 which has been advanced by the sliding chair 6 in synchronism with the rotation of the single revolution shaft until its leading end is under the lifting suckers 19, the supplementary table 1 is in this forward position the lifting suckers 19 can pick the supplementary sheets from the table. Since the two chairs 8 and 9 are raised by their corresponding cams 10 and 11 only when the sliding chair 6 reaches the end of its relative stroke, the forward motion of the supplementary table 1 is timed to synchronise with the rotation of the single revolution shaft, that is to say, the table advances at the appropriate moment.

As soon as the desired number of supplementary sheets has been fed through the printing machine by the lifting suckers 19, the supplementary table can be retracted by placing control lever 12 back into position “A” (retract position). If this is done, rod 13 in cooperation with bellcrank lever 14, 15 displaces the sliding rail 7 and its cams 10 and 11 towards the machine. At the same time, the safety catch 18 drops. Since cam 11 (the forward cam on the sliding rail 7) now ceases to be effective, the forward catch on sliding chair 6 will again engage the front face of the rear stop on table 1. If the sliding chair 6 is not in its position “A” then catch 9 will ride forward over the rear stop on the supplementary table 1 and drop behind the front face of the stop as the sliding chair reaches the forward end of its stroke. During the ensuing return of the chair, the table 1 will thus be entrained by catches 8 and 9 entailing the rear stop. The forward stop on the table will ride under locking catch 18 as the table rolls back, and when the table has reached its fully retracted position the locking catch will engage the front face of the stop thus preventing the table from moving forward again. The rear cam 10 on sliding rail 7 raises the rear catch 8 on chair 6 when this is at the rear end of its stroke and prevents catch 8 from dropping behind the rear stop of the table and from pulling it forward again. The reciprocation of the sliding chair 6, controlled by the single revolution shaft, can therefore continue without affecting the stationary supplementary table 1, permitting the lifting suckers to pick up the uppermost sheets from the principal paper feeding table in the normal way.

I claim:

1. Means for feeding sheets of paper to a printing and duplicating machine comprising a frame, a table on said frame for a stack of sheets of paper, means on said frame for feeding a sheet from said stack to said machine, a supporting frame mounted on said frame above said table, a supplementary table mounted slidingly on said supporting frame above said table for interfeeding supplementary sheets to said feeding means, stop means upon said supplementary table, a rail mounted slidingly in said supporting frame extending in the direction of feed of said sheets, cams mounted at each end of said sliding rail, means for adjusting said sliding rail longitudinally with said cam means in tandem, catch means slidably mounted on said rail selectively cooperating with said cams and said stop means dependent upon the position of said rail to move said supplementary table, means for reciprocating said catch means in said machine on said rail, means for manually operating said adjusting rear stop on said rail so that said catch means may be coupled or disconnected from said stop means on said supplementary table by said cams so that sheets on said supplementary table are brought to or from said feeding means.

2. Means for feeding sheets of paper as set forth in claim 1 wherein said sliding rail and said supplementary table are mounted at an angle to said table.

3. Means for feeding sheets of paper as set forth in
claim 1 wherein said catch means comprises two catches, one of said catches operating to move said supplementary table and the other operated by said adjusting means for said rail operating as a safety catch to hold said supplementary table from said feeding means.

4. Means for feeding sheets of paper as set forth in claim 1 wherein a safety catch is mounted on said supporting frame cooperating with said supplementary table to hold said supplementary table away from said feeding means.

5. Means for feeding sheets of paper as set forth in claim 1 wherein said supporting frame is detachably mounted upon said first mentioned frame.

6. Means for feeding sheets of paper as set forth in claim 1 wherein said supplementary table is slidably reciprocally mounted on rollers in said supporting frame.

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