

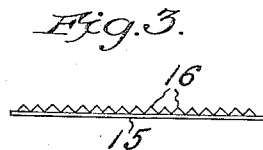
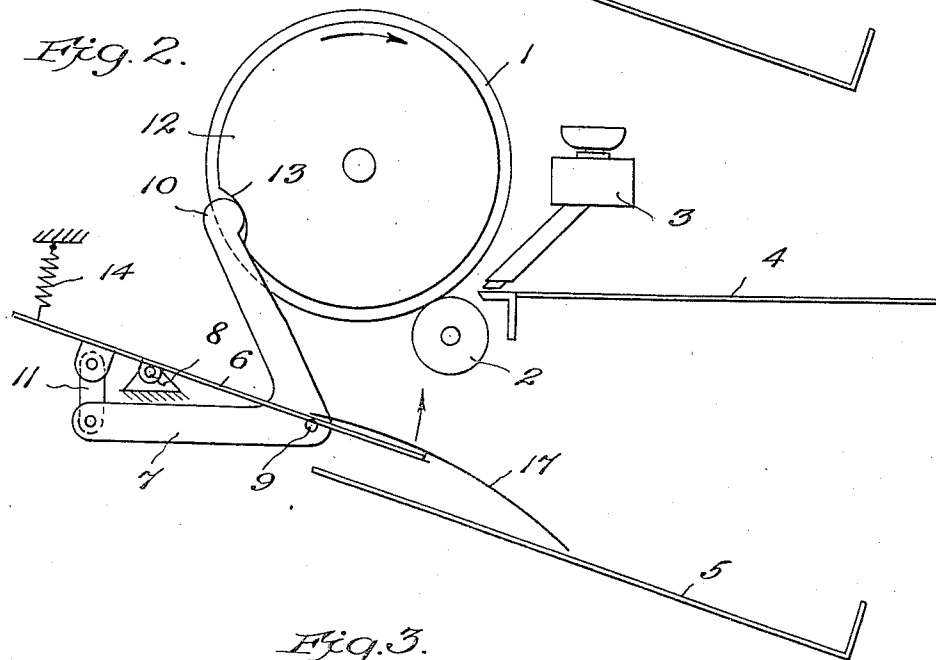
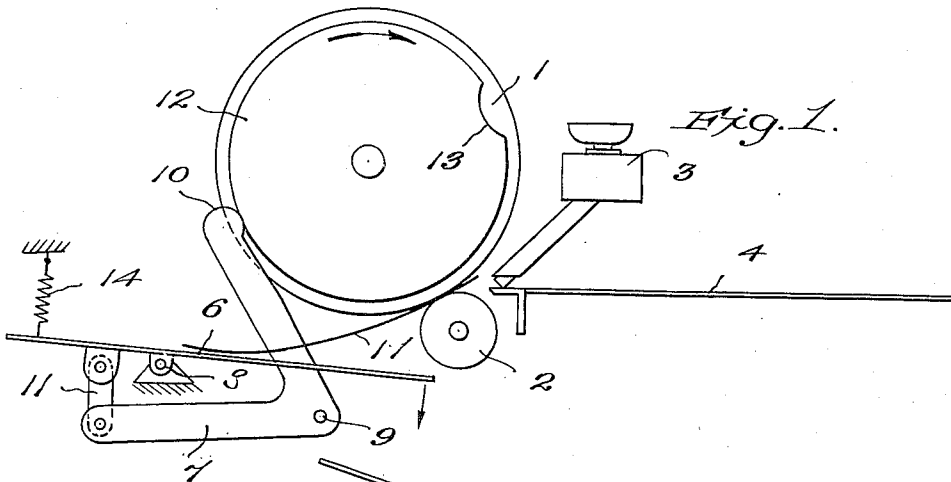
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DELIVERY DEVICE FOR DUPLICATING MACHINES

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DELIVERY DEVICE FOR DUPLICATING
MACHINES

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The present invention relates to delivery devices for duplicating machines, and, more particularly, to an automatic delivery device for duplicating machines of the type in which lines, portions or the entire surface of a copyable mirror-script original are selectively printed onto a copy sheet or card, previously moistened with a readily volatilizing ink solvent.

In conventional duplicating machines of the character described, the printed copy sheets or cards fell to one side of the printing roller on the far side of the machine from the operator after they have been passed through the machine. This had the inconvenience that if it was desired to make several impressions successively on the same sheet or card of different portions of the copyable original the operator had to walk around the machine from the operating to the delivery side and to recover the printed copy sheets. The problem was further aggravated by the necessity of providing several impressions in succession on the same copy sheets, which arises quite frequently with duplicating machines used for bookkeeping, ticket printing and the like. Consequently, the art was badly in need of an improved delivery device which would eliminate the loss of time and trouble entailed in walking around the machine to the delivery side thereof and in picking up the printed copy sheets and which would return the printed copy sheets to an accessible region which was within easy reach of the operator. Prior attempts to solve the outstanding problem failed due to many causes including the fact that the suggested structures reversed the printed sheet and returned same to the operator with its printed side downwards, or required insertion of the copy sheet into the machine with its reverse side, which was to remain unprinted, upwards. Of course, delivery devices of this type have been useless for duplicating machines of the type contemplated, in which a different and selected portion or line of the original is printed at a time, because the operator could not see the side of the copy sheet or form to be printed and could not insert the same into the machine in the desired lateral position which is, of course, different for the individual impressions. Although many other attempts and proposals have been made to solve the outstanding problem, none of these attempts or proposals, as far as I am aware, has been completely satisfactory and successful especially when carried into practice on commercial machines.

I have discovered that the problem may be solved in a remarkably simple manner,

It is an object of the present invention to provide an improved delivery device for duplicating machines which delivers the printed copy sheets or cards within easy reach of the operator with their printed side upwards.

It is another object of the present invention to provide a delivery device for duplicating machines printing selected portions of a copyable mirror-script original onto sheets previously moistened with a rapidly volatilizing solvent which is automatically operated by each rotation of the printing roller and which reverses the direction of movement of the printed copy sheet after the printing operation so as to return the sheet to a region within reach of the operator.

It is a further object of the invention to provide a delivery device for duplicating machines which includes a pivoted delivery table actuated by the printing roller and adapted to return the printed copy sheet to a collecting table immediately before the operator.

The invention also contemplates an improved delivery device for duplicating machines which is simple in construction and reliable and fool-proof in its operation.

Other and further objects and advantages of the invention will appear from the following description taken in conjunction with the accompanying drawing, in which:—

Fig. 1 illustrates a diagrammatic side elevational view of a duplicating machine embodying the principles of the present invention;

Fig. 2 depicts the duplicating machine shown in Fig. 1 in the position when the printed copy sheet is delivered; and

Fig. 3 shows a fragmentary and sectional view of a modified delivery table used in the delivery device according to the invention.

Broadly stated, I provide according to the principles of my invention a pivoted delivery table located behind the printing drum and adapted to receive the printed copy sheet discharged by the duplicating machine. I prefer to arrange this delivery table in a horizontal or slightly inclined position when receiving the copy sheet and provide means actuated by the printing roller to swing the said table into a forwardly sloping position after it has received the copy sheet. The delivery table co-operates with a stationary collecting table located underneath the said delivery table and, in effect, extending the same to a region within reach of the operator. When the delivery table with the printed copy sheet thereon is tilted forward, the copy sheet will slide downward until it hits against a stop provided

at the lowermost end of the collecting table where it is easily accessible to the operator. I have found that the novel combination of the pivoted delivery and stationary collecting table is extremely reliable in operation because the impulse imparted to the copy sheet during the swinging movement of the delivery table causes the sheet to slide rapidly and in a reliable manner to the end of the collecting table. Preferably, the delivery table or the collecting table or both are provided with smooth polished rods, metal strips and the like having a suitable cross-section to further reduce the friction between the table and the moving copy sheet, as those skilled in the art will readily understand.

For the purpose of giving those skilled in the art a better understanding of the invention, the present delivery device will now be more fully described in conjunction with the accompanying drawing illustrating a preferred embodiment of the invention.

Referring more particularly to Figs. 1 and 2, of the drawing, a rotatable printing roller 1 bearing a copyable mirror-script original co-operates with a counter pressure roller 2. A feed table 4 and a moistening device 3, dispensing a readily volatilizing solvent are arranged in front of the bight of said rollers to permit the introduction of a copy sheet into the bight and the moistening with the said solvent. A delivery table 6, pivoted on pin 8 and held by spring 14 in a slightly inclined position, is provided behind the printing drum and is adapted to receive the printed copy sheet. A bell crank lever 7 which is pivoted on pin 9, has one of its ends joined to the pivoted delivery table by means of link 11. The free end 10 of bell crank lever 7 slides on a cam 12 rigidly fastened to the printing roller 1. Cam 12 is provided with a recess 13 adapted to receive the rounded end 10 of the bell crank lever. An inclined stationary collecting table 5 is arranged as an extension of the movable delivery table 6 and at a lower level with its lower end within easy reach of the operator.

The operation of my improved delivery device will now be readily understood by those skilled in the art. In the normal position of rest, illustrated in Fig. 2, end 10 of bell crank lever 7 rests in the recess or depression 13 in cam 12 mounted on printing roller 1. The delivery table is tilted upwards by lever 7 and link 11 and is now inclined at approximately the same angle as the stationary collecting table 5. When a copy sheet 17 is inserted into the bight of printing roller 1 and counter pressure roller 2, and the machine is started, the end 10 of the bell crank lever will leave the depression 13 and will slide on the circular portion of the cam. This will cause a slight rotary displacement or oscillation of the bell crank lever 7 in counter-clockwise direction which through link 11 will move delivery table 6 into the position indicated in Fig. 1 and will tension spring 14. The delivery table 6 will remain in this position until the printing operation is completely finished and the printed copy sheet 17 with its face upwards is deposited on the almost horizontal delivery table. After the sheet has been deposited under the pressure of spring 14, end 10 of the bell crank lever will enter the recess 13 on cam 12 and will return the delivery table into its former strongly inclined position. Due to the inclination of the delivery table and due to the slight impulse received when the table is suddenly displaced by the bell crank lever and link mechanism, the copy sheet 17 will slide down

the inclined delivery table to the bent up end of the collecting table 5 with its face up and into a region which is readily accessible for the operator for inspection and for reinsertion into the machine, if desired.

The delivery table, or both the delivery table and collecting table are preferably provided with smoothly polished strips or rods to decrease the friction between the table and the copy sheet during its downward sliding movement. A modified embodiment of a table 15 provided with such rods is illustrated in Fig. 3. As it will be readily observed in this embodiment, the friction reducing strips 16 are of triangular cross section, but, of course, rods of semicircular, or any other suitable cross section may be used.

Although I have described my invention in connection with a preferred embodiment thereof, many variations and modifications may be resorted to by those skilled in the art without departing from the principles of the invention. I consider all of these modifications and variations as within the true spirit and scope of my present invention as described hereinabove and as defined by the appended claims.

I claim:—

1. In a delivery device for duplicating machines, the combination comprising a pivoted delivery table adapted to receive a printed copy sheet, means for tilting said table into a forwardly sloping position, and means for actuating said tilting means after said printed copy sheet has been deposited on said table to return said copy sheet to a region within easy reach of the operator of the machine by gravitational action.

2. In a delivery device for duplicating machines, the combination comprising a pivoted delivery table adapted to receive a printed copy sheet, a collecting table located adjoining to and at a lower level than said delivery table in a region within easy reach of the operator of the machine, means for tilting said table into a forwardly sloping position, and means for actuating said tilting means after said printed copy sheet has been deposited on said delivery table to cause said sheet to slide down said delivery table into said collecting table by the action of gravity.

3. In a delivery device for duplicating machines, the combination comprising a pivoted delivery table normally being in a substantially horizontal position and adapted to receive a printed copy sheet, means for tilting said table into a downwardly sloping position to slidably return said printed sheet towards the operator of the machine by gravitational action, means for actuating said tilting means after said printed sheet has been deposited on said delivery table, and a stationary collecting table within easy reach of the operator for receiving said returned sheet.

4. In a delivery device for duplicating machines having a rotatable printing roller, the combination comprising a pivoted delivery table adapted to receive a copy sheet printed onto by said printing roller, means for tilting said table into a downwardly sloping position, means operatively associated with said printing roller to actuate said tilting means and to slidably return said printed sheet towards the operator by gravitational action, and a stationary collecting table located at a level lower than said delivery table and within easy reach of the operator for receiving said returned sheet.

5. In a delivery device for duplicating ma-

chines having a rotatable printing roller, the combination comprising a pivoted delivery table located on the far side of the machine from the operator adapted to receive a printed copy sheet discharged by said printing roller, means for tilting said delivery table into a forwardly sloping position, means including a cam mounted on said printing roller for actuating said tilting means during the rotation of said printing roller and to slidably return said printed sheet towards the operator by gravitational action, and a collecting table adjoining said delivery table and located in a region within easy reach of the operator for receiving said returned sheet.

6. In a delivery device for duplicating machines having a rotatable printing roller, the combination comprising a pivoted delivery table located on the far side of the machine from the operator adapted to receive a printed copy sheet discharged by said printing roller, resilient means normally holding said pivoted table in approximately horizontal position, a circular cam disk having a recess rigidly fastened to said printing roller, a bell crank lever having one end linked to said delivery table and having its other end sliding on said cam disk whereby said table will be tilted into a forwardly sloping position when the end of said bell crank lever enters said recess on said cam disk and said discharged sheet will slide down said delivery table by gravitational action into a region within easy reach of the operator.

7. In a delivery device for duplicating machines having a rotatable printing roller, the combination comprising a pivoted delivery table adapted to receive a copy sheet discharged by said printing roller, means for tilting said de-

livery table into a downwardly sloping position, means operatively associated with said printing drum to actuate said tilting means in a predetermined position of said roller and to slidably return said printed sheet towards the operator by gravitational action, and a stationary collecting table located at a level lower than said delivery table and within easy reach of the operator for receiving said returned sheet.

8. In a delivery device for duplicating machines having a rotatable printing roller, the combination comprising a pivoted delivery table adapted to receive a copy sheet discharged by said printing roller, said table normally being in a position sufficiently near to the horizontal to retain said sheet against the action of gravity, means for tilting said table into a sloping position to cause said sheet to slide down said table under the action of gravity, and means operatively associated with said printing roller to actuate said tilting means after each printing operation.

9. In a delivery device for duplicating machines having a rotatable printing roller, the combination comprising a pivoted delivery table adapted to receive a printed copy sheet discharged by said printing roller, said table normally being in a position sufficiently near to the horizontal to retain said sheet against the action of gravity and being adapted to be tilted into a sloping position to cause said sheet to slide down under gravitational action, and means operatively associated with said printing roller to momentarily tilt said table and to impart a slight starting impulse to said sheet.

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