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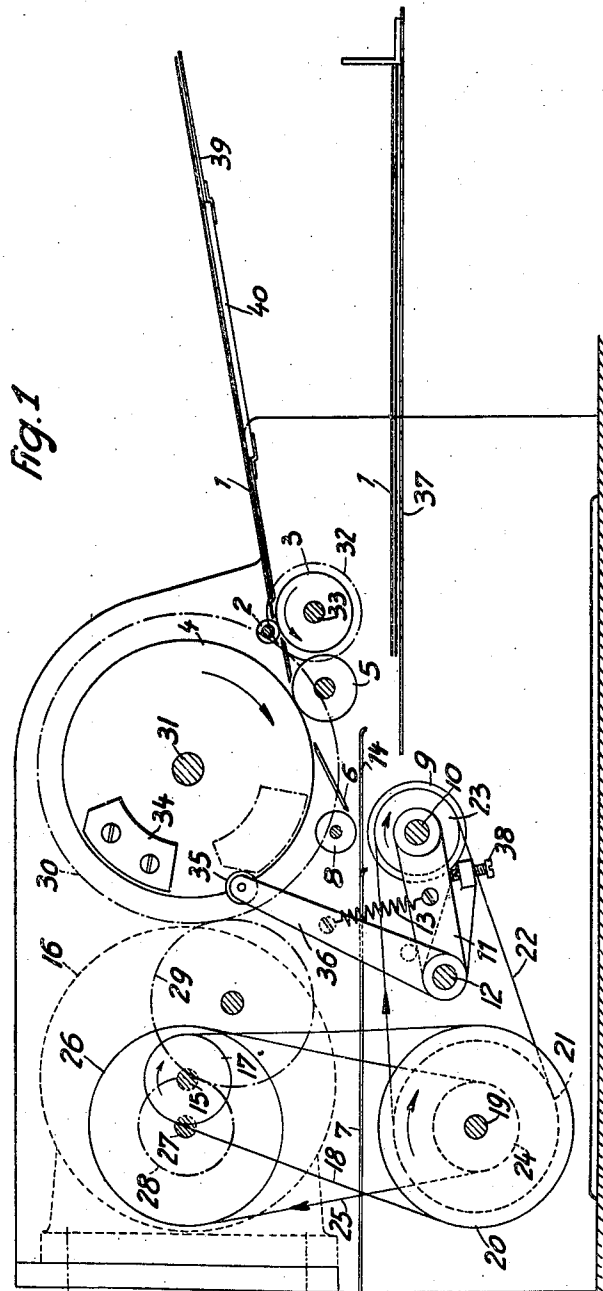
W. RITZERFELD

2,220,283

ROTARY DUPLICATOR

Filed Oct. 14, 1938

2 Sheets-Sheet 1



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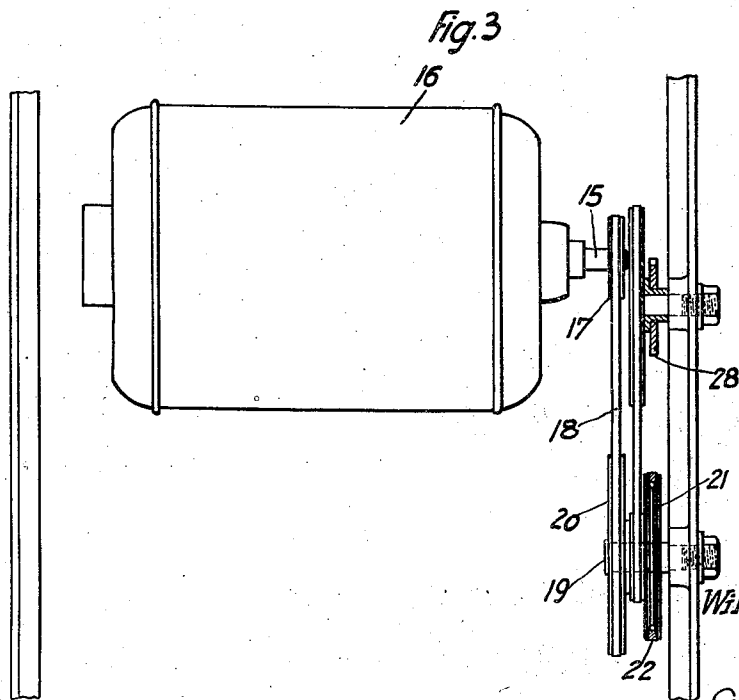
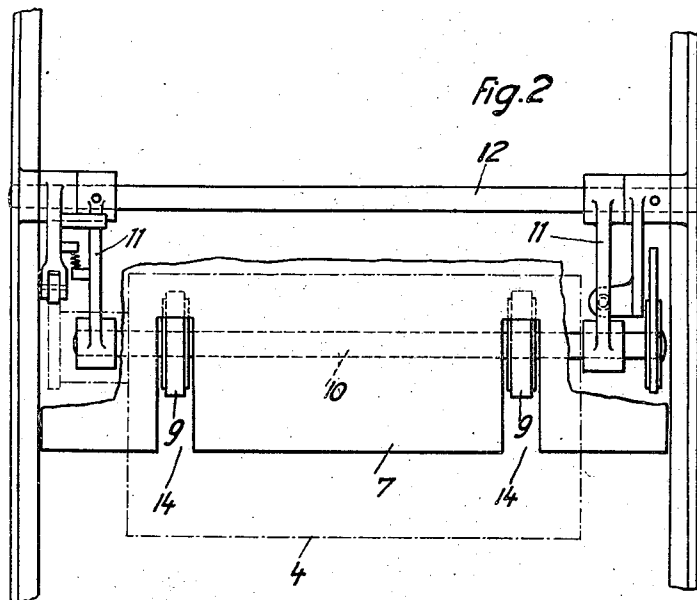
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ROTARY DUPLICATOR

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9 Claims. (Cl. 101-132)

This invention relates to rotary duplicators with a device for bringing back the printed sheets towards the feeding side, i. e. towards that side on which the person operating the duplicator is to be found and has for its object to provide improvements therein. These known rotary duplicators consist in a printing drum with means for holding the original, a counter-pressure roller, a moistener in case of a mirror script original, if wanted supply means for the sheets to be printed upon and—also if wanted—means to take up the sheets printed upon.

The invention consists in a process of bringing back the discharged sheets, after passing the printing drum in a direction opposite to the feed direction at a speed which is preferably faster than the speed of rotation of the drum, towards the feeding side and therewith into the range of vision of the person operating the machine.

As means for carrying out this process according to the invention rolls or rollers are particularly suitable which can be moved by a printing drum periodically against a guiding roller for the printed sheets. The direction of rotation of these rolls or rollers depends on whether the feeding of the sheets to be printed takes place below or above the drum. It is however important for a good working that these rolls or rollers have a greater speed of rotation than the printing drum itself.

Further details of the invention are given below by way of example and also illustrated by way of example in the attached drawings wherein:

Fig. 1 is a side elevation of one form of device made in accordance with the invention,

Fig. 2 is a partial plan,

Fig. 3 is a front view of the driving mechanism.

The sheet 1, which is to be printed is pushed up with its front edge against the meeting line of the transporting rollers 2 and 3, which guide the sheet to the printing roller 4 or the pressure roller 5. After printing has taken place the printed sheet 1 below the guiding plate 6 arrives on the back receiving plate 7, but only so far that the hinder end can still be gripped by rolls or a roller 8 and the rolls or roller 9 which can cooperate with it. The rollers 9 are disposed on an axle 10 which is borne in arms 11 pivotally fastened at 12. The arms 11 are under the influence of one or more springs 13. In consequence of this mounting the rollers 9 are in constant rapid revolution in the direction of the arrow, from the drive of the machine, can be

pressed against the rollers 8. For this purpose slots 14 (Fig. 2) are provided in the back receiving plate 7, through which the rollers 9 can penetrate. Known means, for example gear wheels, belts, chains or the like can be used for driving the rolls or rollers 9 from the axle 15 of the motor 16. In the form of construction illustrated a pulley 17 is provided on the motor axle 15 from which a belt 18 leads to a main pulley 20 rotatable round the shaft 19. On the shaft 19 is secured a second pulley 21 from which a belt 22 drives the pulley 23 seated on the axle 10 and therewith the axle 10 and the rollers 9. On the axle 19 of the main pulley 20 is further secured a pulley 24 which, through the belt 25, drives a pulley 26 on the axle 27 of which a gear wheel 28 is secured. Through the gear wheel 29 the gear wheel 28 drives the gear wheel 30 which is secured on the axle 31 of the drum 4. The gear wheel 30 engages a gear wheel 32 which is provided on the axle 33 of the transporting roller 3 and gives the latter a rotary movement in the direction of the arrow.

On the front face of the drum 4 is fastened a curved member 34 which acts on the roller 35 of the arm 36 secured on the axle 12. With the help of this device the rollers 9 are pressed against the rollers 8 at the moment in which the hinder end of the printed sheet lies between the rollers 8 and 9. By this means the sheet is conveyed back and on to the receiving table 37. An adjusting screw 38 serves for the regulation of the pressure stroke of the roller 9, whilst the spring 13 serves to regulate the pressure.

From the following description, the operation of the apparatus will be readily understood by those skilled in the art. Sheet 1 to be printed onto is placed on feed table 39 and is introduced into the bight of feed or transporting rollers 2 and 3 which convey the sheet to the printing drum 4 and the pressure roller 5. After the impression has been made by means of the printing drum and the pressure roller, guided by the lower surface of plate 6, the sheet is deposited on receiving plate 7 in such a position that its rear portion covers slots 14 provided in the receiving plate and is resting between rollers 8 and 9. During further rotation of printing drum 4, cam 34 will engage roller 35 on the end of arm 36 and will cause rotational displacement of arm 36 and of arms 11 mounted on a common shaft 12. This displacement causes rollers 9 rotated by belt 22 to extend through slots 14 and to be pressed against roller 8 whereby the printed sheet between rollers 8 and 9 will be engaged

and due to the direction of rotation of the circumferential surface of rollers 9 will be displaced in a direction opposite to that during the printing operation and will be deposited on collecting table 37. Due to the fact that the circumferential speed of rollers 9 is higher than that of printing drum 4, this returning displacement has a considerably higher speed than that of the printing displacement.

In the form of construction illustrated an observation opening, i. e. a transparent disc, preferably a glass or Celluloid disc 40 is disposed in the table 39 so that the person operating the machine can examine the sheet 1 which falls on the collecting table 37 before laying a new sheet on the feed table 39.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A rotary duplicator comprising a printing drum, a motor to rotate said drum, means to transfer the rotary movement of said motor to said printing drum, means to feed the blank sheets to said printing drum, means to press these blank sheets to the drum, means for taking up the sheets printed upon, rotary means for bringing back the printed sheets in a direction opposite to the feeding direction, said rotary means being mounted on an axle, this axle being mounted in pivotally arranged arms, means to rotate said rotary means and means to move said rotary means and said means for bringing back the printed sheets relatively to each other.

2. A rotary duplicator comprising a printing drum, means to rotate said drum, a table adapted to feed the blank sheets to said drum, a roller adapted to press said sheets against said drum, a table adapted to take up said sheets now printed, rotary elements adapted to bring back the printed sheets in a direction opposite to the feeding direction to the feeding side, said table for taking up the sheets being provided with slots allowing the rotary elements to penetrate, these elements being mounted on an axle, this axle being mounted in pivotally arranged arms, means for rotary driving said elements and means to move said elements periodically from the printing drum towards the table for taking up the sheets.

3. A rotary duplicator comprising a printing drum, means to rotate said drum, a table adapted to feed the blank sheets to said drum, a roller adapted to press said sheets against said drum, an observation opening arranged in said feeding table, a table adapted to take up the printed sheets, means to bring the printed sheets to said table, said means consisting of rotary elements being rigidly mounted, rolls adapted to bring back the printed sheets in a direction opposite to the feeding direction at a speed faster than that of the printing drum, said rolls mounted on an axle which is mounted in pivotally arranged arms, means to drive said rolls and means to move them from the printing drum periodically to said rigidly mounted rotary elements.

4. A rotary duplicator comprising a printing drum, means to rotate said drum, a table adapted to feed the blank sheets to said drum, a roller adapted to press said sheets against said drum, an observation opening arranged in said feeding table, a table adapted to take up the printed sheets, means to bring the printed sheets to said table, said means consisting of rotary elements

being rigidly mounted, rolls adapted to bring back the printed sheets in a direction opposite to the feeding direction at a speed faster than that of the printing drum, said rolls mounted on an axle which is mounted in pivotally arranged arms, means to drive said rolls and means to move them from the printing drum periodically to said rigidly mounted rotary elements, finally a table for taking up the printed sheets arranged below an observation opening of said feeding table and beneath the said table for taking up the sheets.

5. A rotary duplicator comprising in combination a printing drum, means for rotating said drum, means for feeding clear sheets to be printed onto said drum in a tangential direction, means for pressing said sheets against said drum, means for receiving the printed sheets, means for returning said printed sheets to the feeding side of said duplicator in a direction opposite to the feeding direction at a speed higher than the feeding speed, and means for driving said sheet-returning means.

6. A rotary duplicator comprising in combination a printing drum, a pressure roller for pressing clear sheets to be printed onto against said drum, a pair of feed rollers for feeding said sheets to the bight of said printing drum and said pressure roller, a table for receiving the printed sheets and having slots provided therein adapted to be covered by the rear portion of said printed sheets deposited thereon, a sheet-returning roller for each of said slots adapted to be displaced in a direction vertical to their axis of rotation to protrude through said slots and to engage said sheet, a motor for driving said drum and said feed and sheet-returning rollers at predetermined relative velocities, a roller adapted to cooperate with said sheet-returning rollers rotatably mounted in a stationary position opposite to said rollers, pivotally mounted arms for supporting said sheet-returning rollers, a control arm for displacing said pivotally mounted arms from an inoperative into an operative position to have said sheet-returning rollers protrude through said slots and to press said printed sheets against said stationary roller and to return said sheet to the feeding side of said duplicator, and means for adjusting the pressure of said sheet-returning rollers.

7. A rotary duplicator comprising in combination a printing drum, means for rotating said drum, means for feeding clear sheets to be printed onto said drum in a tangential direction, means for pressing said sheets to the drum, means for receiving the printed sheets, means for returning said printed sheets to the feeding side of said duplicator in a direction opposite to the feeding direction at a speed higher than the feeding speed, means for continuously driving said sheet-returning means, and means actuatable by said printing drum in a predetermined position thereof to displace said sheet-returning means from an inoperative into an operative and sheet-engaging position.

8. A rotary duplicator comprising in combination a printing drum, means for pressing clear sheets to be printed onto against said drum, means for feeding said sheets to said drum, a table for receiving the printed sheets and having slots therein adapted to be covered by the rear portion of a deposited sheet, a sheet-returning roller for each of said slots adapted to be displaced from an inoperative position into an operative position to protrude through said slots

and to engage said deposited sheet, a stationary roller rotatably mounted above said table in co-operating position with said sheet-returning rollers, means for driving said drum and said sheet-returning rollers at predetermined relative velocities, and means operable by said printing drum in a predetermined position thereof to periodically displace said sheet-returning rollers into their operative position and to return said printed sheet to the feeding side of said duplicator.

9. The method of duplicating copyable originals onto clear sheets which comprises simul-

taneously engaging both sides of a copy sheet by a pair of rotary cylindrical surfaces to displace said sheet into the bight of a printing and counter pressure roller, passing said sheet through the bight of said rollers to print a copy of said original onto the same, and subsequently engaging both sides of said printed copy sheet by another pair of rotary cylindrical surfaces to displace said sheet at a higher speed in the opposite direction and thereby to return the same to the feed side.

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