Dec. 27, 1938. W. RITZERFELD 2,141,407

DUPLICATING APPARATUS

Filed Aug. 8, 1932 2 Sheets-Sheet 1

Fig. 1

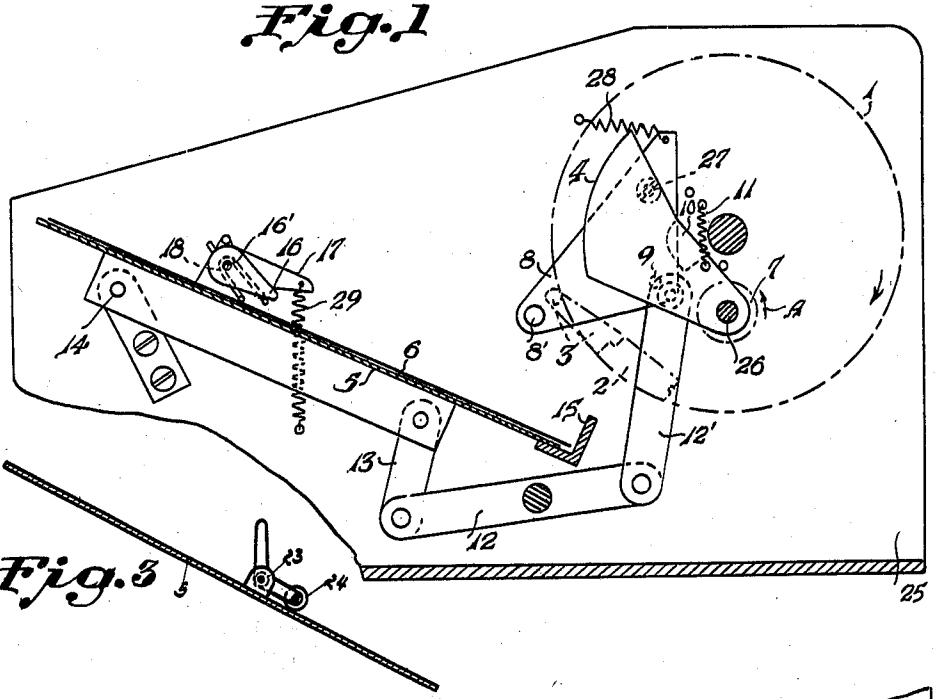
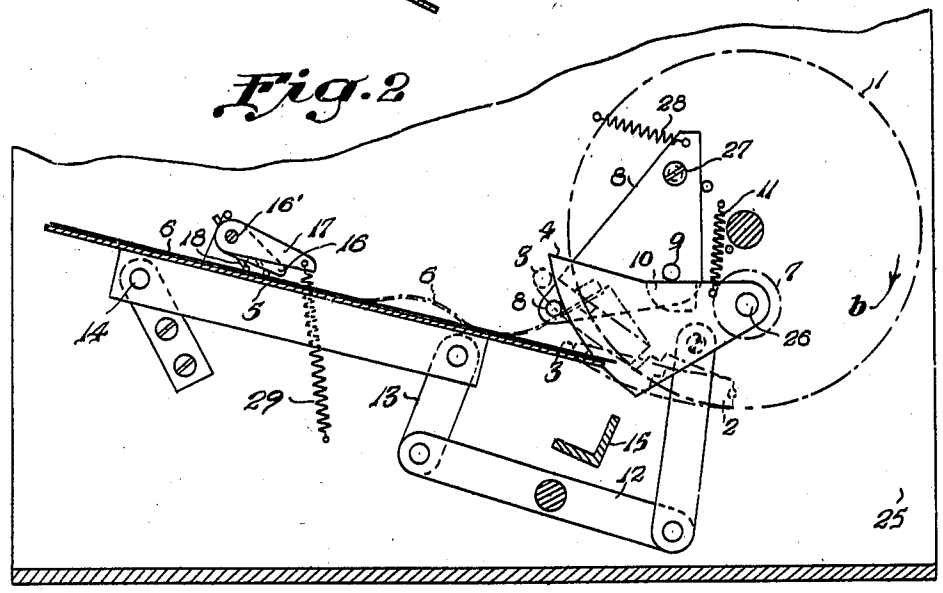


Fig. 3

Fig. 2



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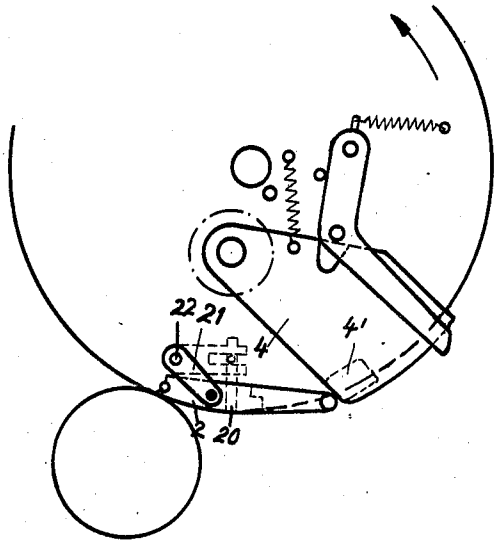


Fig. 4

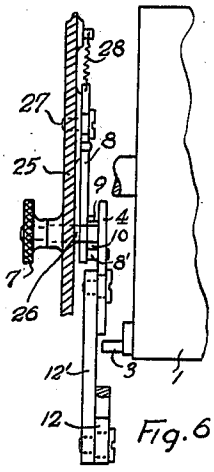


Fig. 6

Fig. 5

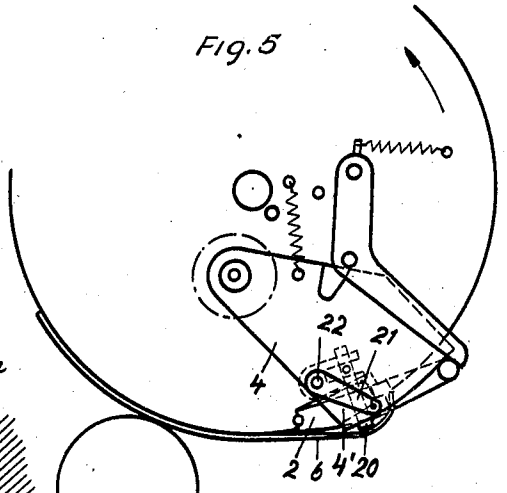
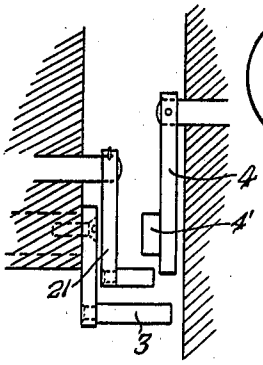


Fig. 4a



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UNITED STATES PATENT OFFICE

2,141,407

DUPLICATING APPARATUS

Wilhelm Ritzerfeld, Berlin, Germany

Application August 8, 1932, Serial No. 627,982
In Germany August 11, 1931

13 Claims. (Cl. 101—132)

This invention relates to a device for automatically securing and releasing master sheets or cards in connection with duplicating apparatus.

It is an object of this invention to provide means whereby the gripping and releasing of the master sheet or card by the printing cylinder is performed automatically during the rotation of the cylinder without interruption in the general operation.

A feed board may be situated permanently within reach of the printing cylinder, or may be oscillated into such position for the purpose of changing the master sheet, which may be held on the table by a suitable gripper of holding means, which may be arranged above the feed board, so that the board together with the master sheet is pressed against the holding device, when the board is lifted.

Means may also be provided for ensuring proper removal of the sheet from the printing cylinder.

The invention is illustrated by way of example in the accompanying drawings, in which

Fig. 1 is an elevational view of the device in the position of rest.

Fig. 2 is a similar view of the device showing the gripping of the sheet of the cylinder.

Fig. 3 is an elevation of a modified form of holding device for the master sheet.

Fig. 4 is a part elevational view of the device, in the position of rest, with ejecting means for the card or sheet.

Fig. 4a is an elevational view of the lever mechanism.

Fig. 5 is a similar view of the device at the moment when the sheet is being ejected.

Fig. 6 is a fragmentary side elevational view of the drum with the adjacent parts shown in section.

Referring to the drawings, 25 is one of the side walls or standards of the apparatus and 1 is the printing cylinder supported therein. 2 is a gripper bar hingedly secured in an axially extending groove in the circumferential portion of the cylinder and 3 is an arm fixed to the bar and extending beyond the circumference of the cylinder. 4 is a cam member fixed to a pivot pin 26 extending across the standard 25 and having a knob 7 mounted on its outer end. 8 is a stop member pivoted to the standard 25 at 27 and carrying a pin 8' at its outer end and another pin 9 at an intermediate point. 10 is a check on the cam member and 11 is a spring holding the said member in inoperative position. 28 is a spring acting on stop member 8. 5 is a feed board mounted for oscillation about a pivot 14, 6 is a master sheet resting on the board, 15 is a stationary abutment in front of and supporting the board. 12 is a balance member arranged below the feed end of the board and 12' and 13 are links connecting opposite ends of the balance member with the cam member 4 and the feed board 5, respectively. 16' is a spindle located above the feed board and 16 is one out of a number of holding or gripping members fixed thereon. 17 is one of two arms fixed on the ends of spindle 16' and 29 is the spring controlling this arm. 18 is a spring tending to lift the members 16.

The operation of this device is as follows:

When the master sheet or card 6 on the feed board shall be fed to the printing cylinder, the knob 7 is turned in the direction of the arrow *a* in Fig. 1, whereby the cam member 4 is swung into its operative position (Fig. 2), in which it is in the way of the arm 3, being locked in this position by the pin resting on the abutment 10. On the printing cylinder 1 being now rotated in the direction of the arrow *b*, the arm 3 will ride on the cam and will rock the gripper bar 2 into open position. The throwing in of the cam member has acted, through the mechanism 12', 12, 13 towards lifting the feeding end of the feed board 5 towards the printing cylinder 1 and the master sheet or card 6 resting thereon is now gripped and held down on the board by the members 16 under the action of the springs 29, and is prevented from being displaced on meeting the front edge of the gripper bar 2, the free edge of the sheet or card slipping into the groove above the bar 2. On further rotation of the cylinder 1 the arm 3 acting on the pin 8' pushes aside the locking member 8 and the pin 9 now releases the abutment 10, allowing spring 11 to return the cam member 4 into inoperative position (Fig. 1). At the same time the feed board is returned by gravity and under the pressure exerted thereon by the springs 29 and holding members 16 into its position of rest and the rear end of the master sheet or card is thus released and the sheet or card carried along by the cylinder 1.

A modified form of a holding device for the master sheet or card is illustrated in Fig. 3. Transversely to the table 5 there is provided a rotary shaft 23, on which there is mounted a roller or cylinder 24. The master sheet or card is placed below this roller 24, which prevents the card or sheet from being thrust back when engaged by the gripper bar. Owing to the fact that the roller 24 bears on the original under its own weight and the original adheres to a certain extent to the table by friction alone, the holding of the original by the roller is fully sufficient.

The ejection of the card or sheet 6 after the bar 2 has been opened occurs by means of one or more pins 20, which are mounted in or adjacent to the bar 2 and are lifted by a spindle rocked by an arm 21 mounted thereon when the same meets the cam 41 fixed on cam member 4.

It will be understood that no restriction is made to the specific form of embodiment shown, which

is quoted merely by way of example, and that various modifications are quite possible within the meaning of the above description and the annexed claims without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

1. A machine of the character described comprising in combination a printing drum, means for rotating said printing drum, gripper means on said printing drum for securing a flexible master sheet to said drum, means for displacing said master sheet toward said drum in a direction opposite to that of the rotation of said drum, and means for automatically opening and closing said gripper means for inserting said master sheet into said gripper means and to cause discharge of the old master sheet during the continuous rotation of said drum.

2. A machine of the character described comprising in combination a printing drum, means for rotating said printing drum, gripper means on said printing drum for securing a flexible master sheet to said drum, actuating means for automatically opening and closing said gripper means in predetermined position of said drum, a feed table oscillatably mounted on a stationary axis adapted to be displaced toward said drum and to feed said master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper means in the open condition thereof, and means for operating said gripper actuating means and said feed table in predetermined time relationship.

3. A machine of the character described comprising in combination a printing drum, means for continuously rotating said drum, gripper means on said drum for securing a flexible master sheet thereto, a displaceable cam adapted to open said gripper means during the continuous rotation of said drum, said cam capable of being automatically retained in its operative position during changing of the master sheet, a feed table for said master sheet oscillatably mounted around a stationary axis adapted to be displaced toward said drum and to feed said master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper means in the open condition thereof, and means for providing a predetermined time relationship between the operation of said cam and of said feed table.

4. A machine of the character described comprising in combination a printing drum, means for continuously rotating said drum, gripper means on said printing drum for securing one edge of a flexible master sheet to said drum, a displaceable cam adapted to open said gripper means during the continuous rotation of said drum, said cam capable of being automatically retained in its operative position during changing of the master sheet, a feed table for said master sheet oscillatably mounted around a stationary axis adapted to be displaced toward said drum and to feed said master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper means in the open condition thereof, a lever system operatively connecting said cam and said feed table so that displacement of one of said elements into operative position will automatically displace the other into operative position.

5. A machine of the character described comprising in combination a printing drum, means for continuously rotating said drum, gripper means on said printing drum for securing one edge of a flexible master sheet to said drum, a displaceable cam adapted to open said gripper means during the continuous rotation of said drum, a spring-held locking member adapted to lock said cam in its operative position, means operatively associated with said gripper means to displace said locking member from its locking position against the pressure of said spring, said cam being automatically retained in its operative position during changing of said master sheet, and a feed table for said master sheet oscillatably mounted around a stationary axis adapted to be displaced toward said drum and to feed said master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper means in the open condition thereof.

6. A machine of the character described comprising in combination a printing drum, means for continuously rotating said drum, a clamping bar extending in the surface of said printing drum in a direction parallel to the axis thereof for securing one edge of a flexible master sheet to said drum, a control lever for said clamping bar and mounted at one end thereof, a movably mounted cam adapted to cooperate with said control lever to automatically open said clamping bar during the continuous rotation of said drum, resilient means for said clamping bar for holding the same in closed position, spring-held locking means adapted to lock said cam in its operative position, said control lever of the clamping bar being adapted to move said locking means from its locking position against the pressure of its spring during the rotation of said drum, and a feed table for said master sheet swingably mounted around a stationary axis adapted to be displaced toward said drum and to feed said master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said clamping bar in the open condition thereof, whereby said edge of said master sheet will be engaged and imprisoned by said clamping bar and said master sheet will be folded back and carried along with the printing drum.

7. A machine of the character described which comprises a printing drum, means for continuously rotating said drum, gripper means for securing one edge of a flexible master sheet to said drum, a movable cam adapted to open said gripper means during the continuous rotation of said drum, said cam being capable of automatically remaining in its operative position during changing the master sheets, a feed table for said master sheet oscillatably mounted around a stationary axis adapted to be displaced toward said drum and to feed said master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper means in the open condition thereof, means for holding said master sheet on said feed table, and a stop at the front end of said feed table adapted to prevent sliding off of said master sheet prior to the time said holding means becomes operative.

8. A machine of the character described comprising in combination a cylindrical printing drum, means for continuously rotating said drum, a gripper on said drum for securing one edge of a flexible master sheet to said drum, a control mechanism, means operable by said control mech-

anism in the operative position thereof to actuate said gripper so that at a given angular position of said drum said gripper is moved to its sheet releasing condition during the continuous rotation of said drum whereby an imprisoned master sheet is released from said drum, and a feed device for master sheets under the partial control of said control mechanism adapted to be displaced toward said drum and to feed a second master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper in the sheet releasing condition thereof, said gripper actuating means having means thereafter to automatically release said gripper thus to imprison said second sheet on said drum whereby master sheets may be replaced during the continuous rotation of said drum.

9. A machine of the character described comprising in combination a cylindrical printing drum, means for continuously rotating said drum, a gripper on said drum for securing one edge of a master sheet to said drum, a cam operable by said control mechanism in the operative position thereof to actuate said gripper so that at a given angular position of said drum said gripper is moved to its sheet releasing condition during the continuous rotation of said drum whereby an imprisoned master sheet is released from said drum, and a feed table for master sheets under the partial control of said control mechanism adapted to be displaced toward said drum and to feed a second master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said gripper in the sheet releasing condition thereof, said gripper actuating cam having means to automatically release said gripper thus to imprison the edge of said second sheet on said drum whereby said second sheet originally directed against the rotation of said drum will be folded back and will be carried along with the drum in the direction of rotation thereof.

10. A machine of the character described comprising in combination a cylindrical printing drum, means for continuously rotating said drum, a gripper on said drum for securing one edge of a master sheet to said drum, a control mechanism, means operable by said control mechanism in the operative condition thereof to actuate said gripper so that at a given angular position of said drum said gripper is moved to its sheet releasing condition during the continuous rotation of said drum whereby an imprisoned master sheet is released from said drum, and a feed table for master sheets under the partial control of said control mechanism adapted to be displaced toward said drum and to feed a second master sheet with its protruding edge in a direction opposite to that of the rotation of said drum into the path of said gripper in the sheet releasing condition thereof, said gripper actuating means having means to automatically release said gripper thus to imprison the protruding edge of said second sheet on said drum whereby said second sheet originally directed against the rotation of said drum will be folded back and will be carried along with the drum in the direction of rotation thereof.

11. A machine of the character described comprising in combination a cylindrical printing drum having means to grip and carry a flexible master sheet provided with transferable copy thereon, means for continuously rotating said drum, a pressure roller, means for directing the feeding of a copy sheet between said drum and roller to transfer the copy of said master sheet to said copy sheet, and master-changing means selectively operable during the continuous rotation of said drum whereby said master sheet may be replaced by another during that position of the cycle of rotation of said drum which will not interfere with printing on a new copy sheet during each complete cycle of rotation of said drum, said master-changing means including a feed table constructed and arranged to feed a master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said master gripping means whereby said master sheet originally directed against the rotation of said drum will be folded back and will be carried along with the drum in the direction of rotation thereof.

12. A machine of the character described comprising in combination a cylindrical printing drum having means to grip and carry a flexible master sheet provided with transferable copy thereon, means for rotating said drum, a pressure roller, means for directing the feeding of a copy sheet between said drum and roller to transfer the copy of said master sheet to said copy sheet, and master-changing means automatically operable at the will of the operator at a given angular position of said drum whereby said master sheet may be replaced by another without interfering with the printing on a new copy sheet during each complete cycle of rotation of said drum, said master-changing means including a feed table constructed and arranged to feed a master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said master gripping means whereby said master sheet originally directed against the rotation of said drum will be folded back and will be carried along with the drum in the direction of rotation thereof.

13. A machine of the character described comprising in combination a cylindrical printing drum having means to grip and carry a flexible master sheet provided with transferable copy thereon, means for continuously rotating said drum, a pressure roller, means for directing the feeding of a copy sheet between said drum and roller to transfer the copy of said master sheet to said copy sheet, and master-changing means selectively operable during the continuous rotation of said drum whereby said master sheet may be replaced by another during that portion of the cycle of rotation of said drum which will not interfere with printing on a new copy sheet during each complete cycle of rotation of said drum, said master-changing means including a table movable toward and away from said drum and a cam operatively associated with said table for controlling the operation of said gripping means, said table being constructed and arranged to feed a master sheet with its protruding edge in a direction opposite to that of the rotation of said drum and into the path of said master gripping means whereby said master sheet originally directed against the rotation of said drum will be folded back and will be carried along with the drum in the direction of rotation thereof.

WILHELM RITZERFELD.