June 4, 1935. W. RITZERFELD 2,003,469

DUPLICATING APPARATUS

Original Filed April 29, 1929 2 Sheets-Sheet 1

Fig. 1.

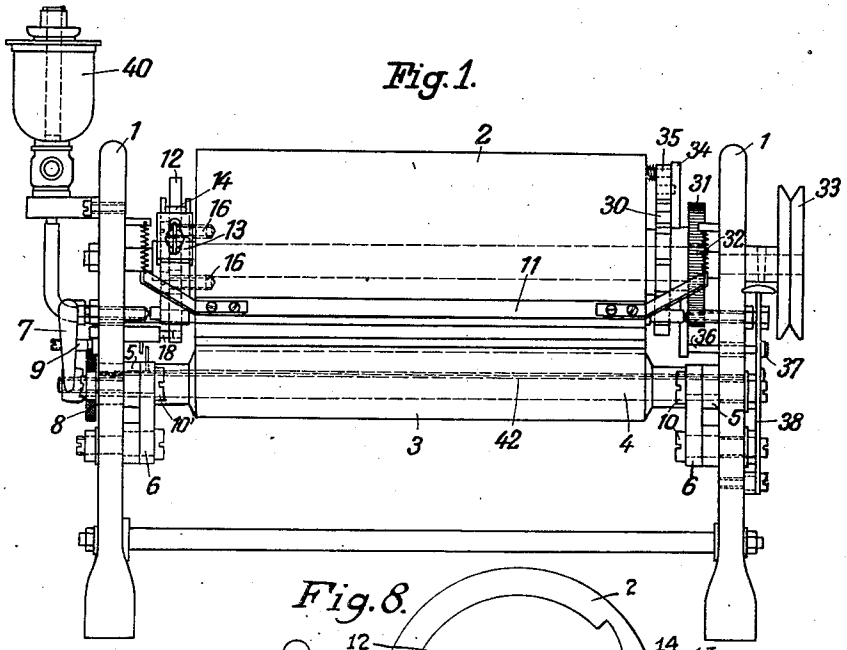


Fig. 8.

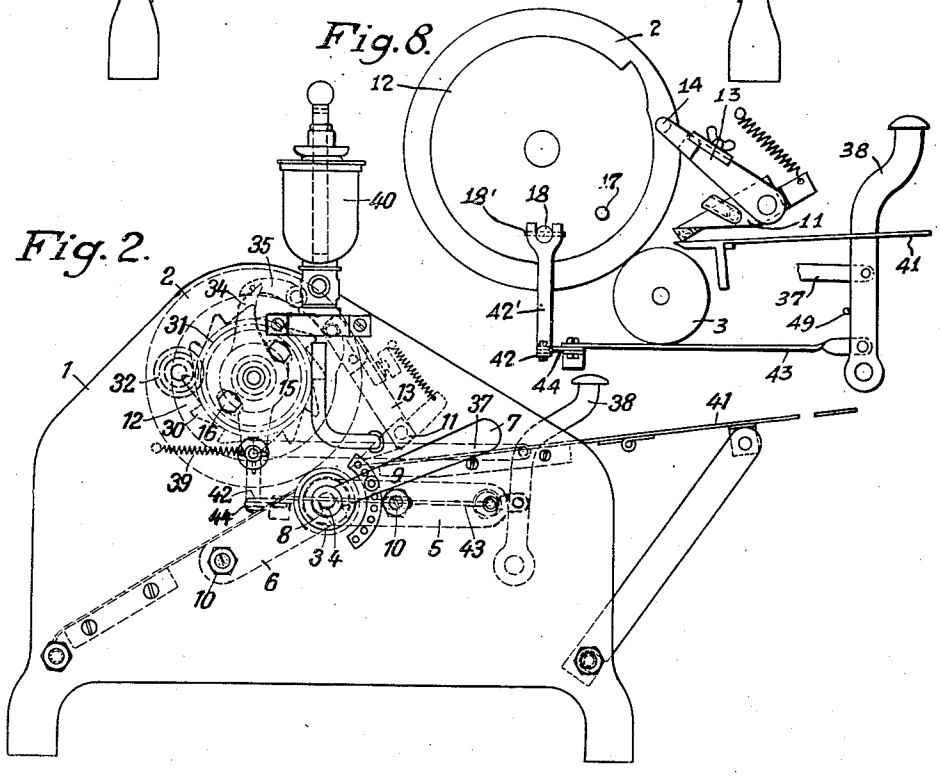


Fig. 2.

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Fig. 3.

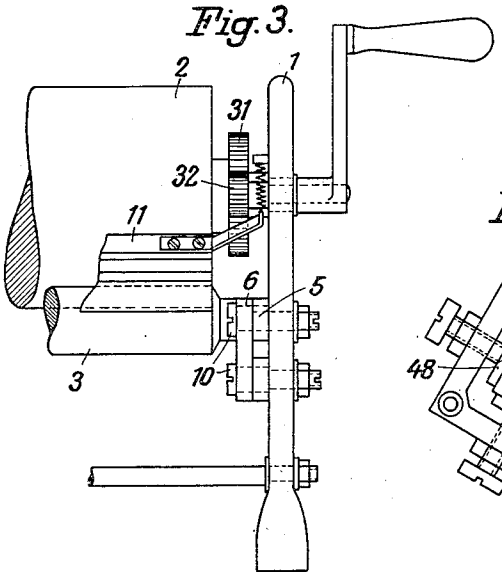


Fig. 7.

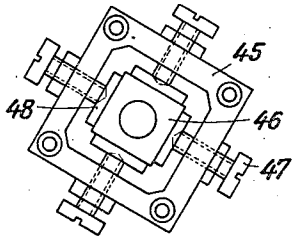


Fig. 4.

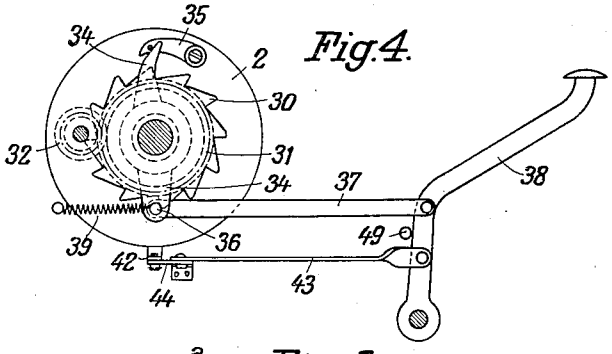


Fig. 5.

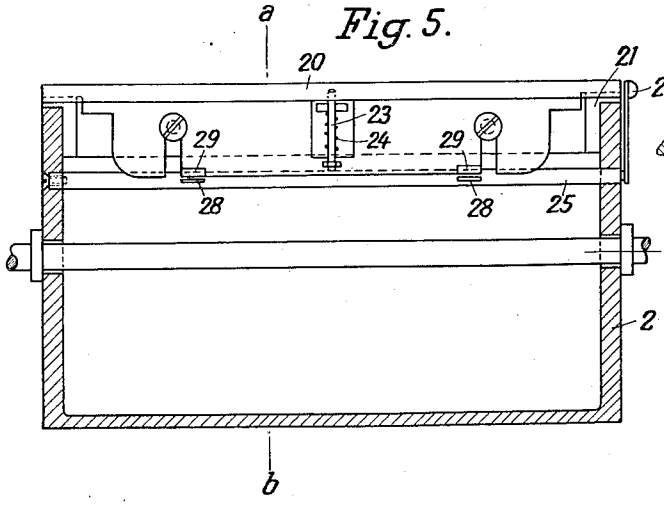
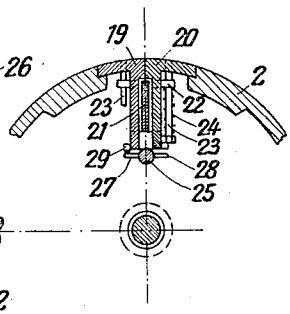


Fig. 6.



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Patented June 4, 1935 2,003,469

UNITED STATES PATENT OFFICE

2,003,469

DUPLICATING APPARATUS

Wilhelm Ritzerfeld, Berlin, Germany

Application April 29, 1929, Serial No. 359,088. Renewed July 13, 1933. In Germany May 9, 1928

27 Claims. (Cl. 101—132)

The present invention relates to duplicating apparatus, and more particularly to a new and special form of embodiment of a machine for duplicating prints, drawings and the like from originals furnished with reverse characters, signs, contours, etc., on to sheets which have previously been moistened.

In carrying the invention into effect, I employ an apparatus for making the copies from the original, which is furnished with reverse characters, etc., capable of being copied off, the original being mounted on a roller, and the sheet on which the copy is to be made passed between the original and a second roller pressing against the same, the sheet by means of a damping device having previously been moistened with a thin film-like coating of rapidly volatilizing liquid, viz., a liquid of that nature which readily and evenly dissolves the ink or color without acting on the sheet in any way in a manner to vary its form, so that a large number of clean copies may be produced which are exactly according to the original.

A special feature of the apparatus resides in the positive connection of the printing roller, pressure roller and damping device in such manner that upon manual operation the passage through the apparatus, the damping of the sheet on which the copy is to be made and the printing of the copy is performed by simply turning the handle, and that in the case of electrically operated apparatus the machine may be set into motion and the copying performed by simply actuating a switch and an index connecting and disconnecting means associated therewith.

The invention will now be described by way of example with reference to the accompanying drawings, in which

Fig. 1 shows a form of embodiment of the apparatus for operation by means of a motor,

Fig. 2 being a side view of the apparatus.

Fig. 3 shows a form of embodiment for manual operation,

Fig. 4 the drive and the appertaining operating members seen from the side.

Fig. 5 shows in section the device for securing the original on the printing roller,

Fig. 6 being a side view of Fig. 5 according to the line A—B.

Fig. 7 shows the method of mounting the pressure roller.

Fig. 8 is a diagrammatic elevation of the printing and pressure rollers showing the lever and associated parts for locking and releasing the printing roller and a portion of the damping mechanism.

As shown in the drawings, the printing roller 2 is mounted so as to be capable of rotation in the frame 1, and is connected with the drive by means of gear wheels. The pressure roller 3, which preferably consists of an elastic material, is variable as regards the amount of pressure capable of being exerted against the printing roller 2. As a result it is possible with, for example, the first fifty copies to press the paper with relatively slight pressure against the original which carries the matter to be printed and then on progressive operation and a greater number of copies to increase one or more times the pressure of the rolls against each other, and together therewith the force with which the sheet to be printed is pressed against the original. For this purpose the axle member 4 of the pressure roller 3 is mounted on both sides by means of bearing pins disposed eccentrically to the centre axis. The pressure roller 3 may be pressed to a greater or lesser extent against the printing roller 2 by means of the grip 7 mounted on the extended axle 4, and secured in its particular relative position to the printing roller by the nut 8. On the grip 7 is provided an abutment 9, and in this abutment a spring presses a ball against the rests furnished in the side wall, which rests, arranged in a circle conforming to the radius of action of the abutment, indicate the different positions of the pressure roller. An essential feature as regards the duplicator resides in the fact that the two rollers rest evenly against each other over their whole length. In order to be able to adjust exactly the position of the pressure roller 3 in relation to the roller 2, the axle member 4 of the pressure roller 3 is suspended, for example, on both sides in the adjustable bearing levers 5 and 6. These levers 5 and 6 may be adjusted as regards their relative position by means of threaded bolts 10 furnished with eccentric abutments, so that in this manner the position of the pressure roller in relation to the roller 2 may be adjusted in perfectly exact manner. Another method of mounting for attaining the same object is shown in Fig. 7. In this case the axle member 4 of the pressure roller 3 is mounted in bearings 46, which are made to be adjustable in a frame 45 in all directions vertical to the axle member 4 by means of screws 47 and clamping plates 48.

The damping device 11 is controlled by means of the cam disk 12. For this purpose there is employed the roller lever 13, which is firmly connected with the damping device 11, and which in the normal position rests with its roller 14 against the projection on the cam disk 12, thus

holding the damping device in the raised position.

If it is intended to make the copies on lined paper, it has hitherto been found extremely difficult with the apparatus usually employed to make the copied characters coincide with the lines, particularly if the original tensioned on the roller does not exactly conform to the sheet on which the copy is to be made.

This drawback is avoided by the present invention by the fact that the initial position of the roller on which the original is mounted is adjustable within certain limits. For this purpose the cam disk 12 is mounted in adjustable manner on the printing roller by the screws 16 passing through the elongated apertures 15 in the cam disk 12. In order to be able to limit the movement of the printing roller 2 after each revolution an index pin 18 is mounted in resilient fashion in the side wall of the apparatus, which pin after each revolution of the roller 2 snaps into a hole 17 in the cam disk 12.

Upon depression of the operating lever 38 a lever mechanism 43 is actuated, which forces the pin 18 out of the hole 17 in the cam disk 12 through the medium of an angle lever 44 and a push rod 42. At the same time, in a manner to be described later, the same movement of the operating lever 38 causes the printing roller 2 to be connected with the driving mechanism and the roller 2 is then able without obstruction to perform a revolution until the index pin 18 again snaps into the hole 17.

If the apparatus is constructed for manual operation, the lever mechanism for actuating the index pin 18 is omitted. The pin projects only to very slight extent into the hole 17 in the cam disk 12, this hole being furnished with sloping edges, so that upon rotation of the roller the pin is then pressed out of the hole 17 without any difficulty.

By means of one of these arrangements as described in conjunction with the adjustable cam disk 12 it is quite possible without any difficulty to make the duplication coincide with the printed lines on the sheet.

An additional and essential feature of the subject matter of the invention consists in the construction of the device which is used to tension the original copy on the printing roller. In the case of duplicating apparatus hitherto in use it is necessary for the pressure roller to be lifted in some manner upon each revolution of the printing roller in order to avoid the tensioning device for the sheet projecting beyond the periphery of the roller; or alternatively it has been necessary to avoid contact between the attachment means and the pressure roller by mounting the said attachment means in a recess in the printing roller. This makes the whole apparatus much more complicated, while moreover in copying from originals, the length of which exceeds the periphery of the printing roller even this method cannot possibly be employed. In the application the tensioning device for the original is so formed that the same exactly conforms to the surface of the printing roller and therefore allows the pressure roller to rest permanently against the printing roller.

The advantage is hereby offered that the sheet to be printed may be placed on the clamping device, thus between the two adjacent rollers (rollers applied against each other) while in previous types of manifolding apparatus the sheet must be placed between the open rolls up to a projection or the like located behind them. The new arrangement produces an essentially smaller, unmoistened and thus unprintable head on the printing sheet. In addition the tensioned beginning of the original registers with the beginning of the printing sheet on passing between the rolls, so that the printed matter on the original and that on the sheet to be printed are in exactly the same position or the same distance from the beginning of the sheet, so that when the original and the copy are superposed exactly at the starting edges the lines or designs thereof also register accurately.

Moreover it is possible by means of the new clamping device to produce copies from originals, the length of which is greater than the periphery of the printing roller, and in the latter case the original is not secured to the printing roller at all, but merely placed over the damping device, and then passed together with the copy sheet between the two rollers. The tensioning device consists of the two clamping bars 19 and 20 which, while being sunk into the printing roller 2, are mounted on a supporting bar 21. The supporting bar 21 possesses two lugs 22, through each of which is passed a bolt 23 riveted to each clamping bar, so that the two clamping bars under the action of the springs 24 are pressed inwardly against the jacket of the printing roller. In order to increase this pressing action, the clamping bars are preferably forced inwardly by means of two springs furnished at each end.

Below the clamping rails is disposed a shaft 25 passing through the printing roller and having a lever 26 mounted on the outside of the printing roller 2, this shaft engaging by means of members 27 and 28 below projections 29 furnished on the clamping bars. Upon rotation of the lever towards the one or the other side, the one or the other of the clamping bars is lifted alternately in a vertical direction by means of the members 27 and 28. In the case of the clamping bar 19 the members 27 and 28 engage in the topmost position behind abutments on the projections 29, so that the clamping bar remains in this topmost position, and does not again return immediately into the jacket of the printing roller until release of the lever 26.

If the apparatus is operated by means of a motor, the power is transmitted from the motor to the apparatus through the medium of a worm gear and cord pulley. Mounted on the axle of the printing roller in a manner capable of rotation is the ratchet wheel 30, which is firmly coupled with the gear wheel 31. Engaging with the gear wheel 31 is the pinion 32, which is mounted in the side wall of the apparatus, and carries at the other end of its shaft the cord pulley 33. Between the gear wheel 31 and the ratchet wheel 30 is mounted, also capable of rotation, the lever 34. Mounted resiliently towards the side of the printing roller 2 is the pawl 35, which by oscillation of the lever 34 may be made to engage with the ratchet wheel 30. The lever 34 is connected with the tie rod 37 by means of the bolt 36, and is actuated by the operating lever 38. The operating lever 38 is limited in its movement by means of the adjustable stop 49. The whole system is maintained in disengaged condition by means of the tension spring 39, that is to say—the pawl 35 is lifted by means of the lever 34 from the ratchet wheel 30, the coupling with the printing roller 2 thus being broken.

In the case of manual operation these parts are omitted with the exception of the gear wheel

31, which in this event is firmly connected with the printing roller 2, and the pinion 32, and the operating handle is mounted on the shaft of the pinion 32.

The operation of the device is as follows: The original from which the copies are to be prepared is tensioned with the signs, characters or contours towards the outside on the printing roller 2 with the assistance of the clamping device as described. The damping device 11 is connected with a reservoir 40 for the damping liquid by a flexible tube 40a. The reservoir 40 may be a commercial regulable drip lubricator, which is ground in fluid-tight for this special purpose, whereby it is possible to regulate the liquid supply, or cut off the supply, by turning the control of the drip lubricator. The sheet of paper or the like, on which the copy is to be made, is passed on the feed table 41 below the damping device 11 to between the rollers, the damping device now being in its elevated position. By rotation of the printing roller the roll lever 13 firmly connected with the damping device moves away from the projection on the cam disk 12, and the damping device thus moves resiliently against the copy sheet. The latter is moved by the rotating rollers, and the copy thus made; by the time the printing roller 2 and the cam disk 12 firmly connected therewith have completed one revolution, the roll lever 13 has again moved on to the projection on the cam disk 12 and has again lifted the damping device.

At the same time the index pin 18 has again snapped into the hole 17, so that the printing roller has accordingly again assumed its original position. When operation is performed by means of a motor, the motor is first switched on, and the gear wheel 31 and together therewith the ratchet wheel 30 rotate in the first place idly about the stationary shaft of the printing roller. The sheet of paper or the like, on which the copy is to be made, is now passed between the rollers in the same manner as in the case of manual operation. If the operating lever 38 is thereupon depressed, the tie rod 37 causes the lever 34 to be oscillated about the shaft of the printing roller, whereby the pawl 35 engages in the ratchet wheel 30 then being rotated. At the same time the index pin 18 is forced out of the hole 17 in the cam disk 12, and the printing roller 2 is released for one revolution. The pawl 35, which is mounted on the printing roller 2, is conjointly moved by the ratchet wheel 30, whereby the printing roller is made to rotate. The function of the damping device is the same as in the case of manual operation. When the printing roller 2 has performed one revolution and caused the copy to be made, the pawl 35 is lifted by the lever 34, which in the meantime has been made to assume its initial position by means of the tension spring 39, and thus moved out of engagement with the ratchet wheel 30, so that the printing roller remains stationary, while the index pin 18 snaps into the hole 17.

To produce a further copy it is merely necessary to insert a fresh sheet of paper and to depress the operating lever 38, whereupon the whole operation is repeated as described.

In endless duplication, that is to say—the preparation of copies from one original on to a continuous web of paper, or in making copies from originals, the length of which is greater than the diameter of the printing roller, it is merely necessary to move over the part with the roll of the lever 13, so that the roll no longer moves against the projection on the cam disk 12 and the damping device is accordingly situated in permanent contact with the paper on which the copies are to be made. The operating lever 38 is caused to remain in the operative, i. e., depressed position, either by hand or by any suitable retaining means, it thus being accomplished that the pawl 35 after each revolution of the printing roller 2 immediately again becomes coupled with the ratchet wheel 30, the printing roller accordingly being conjointly moved in continuous fashion. The resilient index member 18, as long as the operating lever 38 continues to be depressed, is also moved away from the cam disk 12, so that the printing roller is accordingly enabled to rotate continuously without obstruction.

It will be understood that no restriction is made exactly to the construction as described, and that various modifications may be made without departing from the spirit of the invention as set forth in the appended claims.

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

1. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination of a printing roller bearing copyable mirror-script original, a pressure roller pressing copy sheets against the said printing roller, a damping device furnishing the copy sheets with a coating of said rapidly volatilizing liquid, means for actuating the printing roller, the pressure roller and the damping device in mutually dependent fashion, means for moving the said damping device into permanent contact with the copy sheets, and means for allowing the said printing roller to perform a desired number of revolutions in succession.

2. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination of a printing roller, a pressure roller pressing copy sheets against the said printing roller, a damping device furnishing the copy sheets with a coating of said rapidly volatilizing liquid, means for actuating the printing roller, the pressure roller and the damping device in mutually dependent fashion, and radially displaceable clamping means for securing a copyable mirror-script original to be duplicated to the said printing roller.

3. In a duplicating apparatus in which copies are made from an original furnished with copyable reverse scripe on to cards, sheets, etc., which have previously been moistened with a thin coating of readily volatile liquid, the combination of a printing roller, a pressure roller pressing the copy sheet against the said printing roller, a damping device furnishing the copy sheet with the coating of said readily volatile liquid, means for commonly actuating the printing roller, the pressure roller and the damping device in mutually dependent fashion, radially displaceable clamping bars for securing the original to the said printing roller, and means for maintaining one of the said bars in the lifted position.

4. In a duplicating apparatus, the combination of a printing roller, clamping means for securing the original to be duplicated on said printing roller, said clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, and a pressure roller adapted to be rotated by said printing roller, said printing roller and said pressure roller being permanently in feeding relation for feeding copy sheets in the apparatus.

5. In a duplicating apparatus, the combination of a printing roller, clamping means for securing the original to be duplicated on said printing roller, said clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, a pressure roller adapted to be rotated by said printing roller, said printing roller and said pressure roller being permanently in feeding relation for feeding copy sheets into the apparatus, a damping device for furnishing the copy sheets with a coating of liquid, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

6. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

7. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic arresting means for said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

8. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, a shaft, a ratchet wheel mounted on said shaft, means for rotating said ratchet wheel, a pawl on said printing roller tending to engage in said ratchet wheel, automatic means for arresting said printing roller, a lever mounted to turn on said shaft, a cam on said lever for throwing out said pawl, a link pivotally connected to said lever, a handle for shifting said link, and means operatively connecting said handle to said arresting means for retracting said arresting means when said handle is operated for releasing said pawl.

9. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller, means for varying the angular position of said member with respect to said printing roller, means operatively connected to said member for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means arranged for engaging in a recess of said member for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

10. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, a spring for holding said damping means against the copy sheets under yielding pressure, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

11. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a cam operatively connected to said printing roller, a roller lever adapted to bear on said cam and connected to said damping device, for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

12. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a cam operatively connected to said printing roller, a roller lever adapted to bear on said cam and to be moved beyond reach of said cam and connected to said damping device, for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

13. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, an elongated receptacle containing absorptive material, a wiper of porous material inserted in the open side of said receptacle, a supply reservoir for liquid, a flexible tube connecting said reservoir to said receptacle, a valve in said reservoir for regulating the flow of the liquid to said receptacle, a control member operatively con-

nected to said printing roller for moving said wiper into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

14. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, means for varying the distance between said printing and pressure rollers, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

15. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, means for varying the distance between said printing and pressure rollers during rotation of said rollers, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

16. In a duplicating apparatus, the combination of a printing roller, a pressure roller for pressing copy sheets against said printing roller, eccentric bearings for said pressure roller, a handle for adjusting said bearings, a damping device furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

17. In a duplicating apparatus, the combination of a printing roller, a pair of clamping members in said printing roller, the outer ends of said members making up a portion of the cylindrical perimeter of the printing roller, for clamping the ends of the original to be duplicated, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

18. In a duplicating apparatus, the combination of a printing roller, a pair of clamping members mounted to slide in said printing roller, the outer ends of said members making up a portion of the cylindrical perimeter of the printing roller, for clamping the ends of the original to be duplicated, a separate spring tending to hold each member against a shoulder of the printing roller, a shaft mounted to turn in said printing roller, arms on said shaft for shifting outwardly the individual members against the action of their springs, a pressure roller for pressing copy sheets against said printing roller, a damping device for furnishing the copy sheets with a coating of liquid, a control member operatively connected to said printing roller for moving said damping device into, and out of, active position with respect to the copy sheets, means including a one-way clutch and a continuously running drive for rotating said printing roller, automatic means for arresting said printing roller, means for throwing in said clutch, and means operatively connected to said throwing-in means for retracting said arresting means when said clutch is thrown in.

19. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, radially displaceable clamping means associated with said printing roller and adapted to hold a copyable mirror-script original, said clamping means forming part of the cylindrical surface of said printing roller, a pressure roller co-operating with said printing roller, and a moistening means for dispensing said rapidly volatilizing liquid.

20. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, radially displaceable clamping means associated with said printing roller and adapted to hold a copyable mirror-script original, said clamping means forming part of the cylindrical surface of said printing roller, a pressure roller co-operating with said printing roller and exerting a continuous pressure on the surface thereof, means for varying said pressure, and a moistening means for dispensing said rapidly volatilizing liquid.

21. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, radially displaceable clamping means associated with said printing roller and forming part of the cylindrical surface thereof, said clamping means being adapted to hold a copyable mirror-script original, a pressure roller co-operating with said printing roller, a moistening means extending toward the bight of said rollers for dispensing said rapidly volatilizing liquid, and cam-like means connected with said printing roller for moving said moistening means into and out of operative position.

22. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, radially displaceable clamping means associated with said printing

roller and forming part of the cylindrical surface thereof, said clamping means being adapted to hold a copyable mirror-script original, a pressure roller co-operating with said printing roller and arranged permanently in feeding relation therewith, and moistening means for dispensing said rapidly volatilizing liquid.

23. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, a pressure roller co-operating with said printing roller, a movable moistening means extending toward the bight of said co-operating rollers for dispensing said rapidly volatilizing liquid, and means operatively associated with the said printing roller for moving said moistening means into and out of operative position.

24. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, clamping means for securing a copyable mirror-script original to said printing roller, said clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, a pressure roller exerting adjustable pressure on said printing roller, a moistening means dispensing said rapidly volatilizing liquid located in front of and extending toward the bight of said rollers, means for rotating said printing roller, and means for arresting said printing roller after each printing operation.

25. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, clamping means for securing a copyable mirror-script original to said printing roller, said clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, resilient means for holding said clamping means flush with the surface of the said printing roller, a pressure roller co-operating with said printing roller, and moistening means extending toward the bight of said co-operating rollers for dispensing said rapidly volatilizing liquid.

26. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, clamping means for holding a copyable mirror-script original said clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, resilient means for holding said clamping means in its closed position, means for opening said clamping means for inserting and removing an original, a pressure roller co-operating with said printing roller, and a moistening means dispensing a rapidly volatilizing liquid.

27. In a duplicating apparatus printing onto sheets previously moistened with a rapidly volatilizing liquid, the combination comprising a rotatable printing roller, clamping means for holding a copyable mirror-script original said clamping means forming part of the cylindrical surface of said printing roller and being capable of radial displacement toward and from the cylindrical surface of said printing roller, resilient means for holding said clamping means in its closed position, means for opening said clamping means including a lever mechanism mounted on one end of said printing roller, a pressure roller exerting continuous and adjustable pressure on said printing roller and a moistening means dispensing said rapidly volatilizing liquid.

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