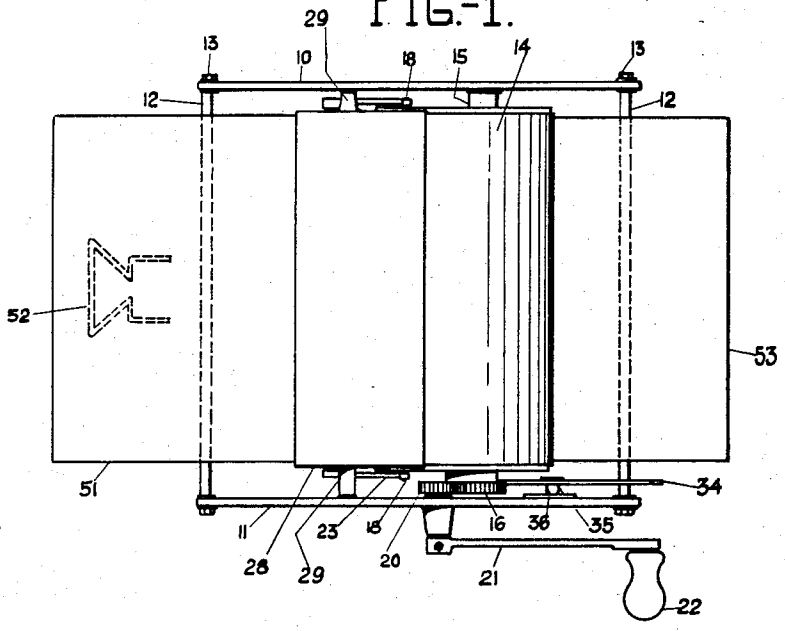
March 2, 1937. E. M. TERRY 2,072,534

DUPLICATING MACHINE AND METHOD

Filed Dec. 2, 1935 3 Sheets-Sheet 1

FIG.-1.



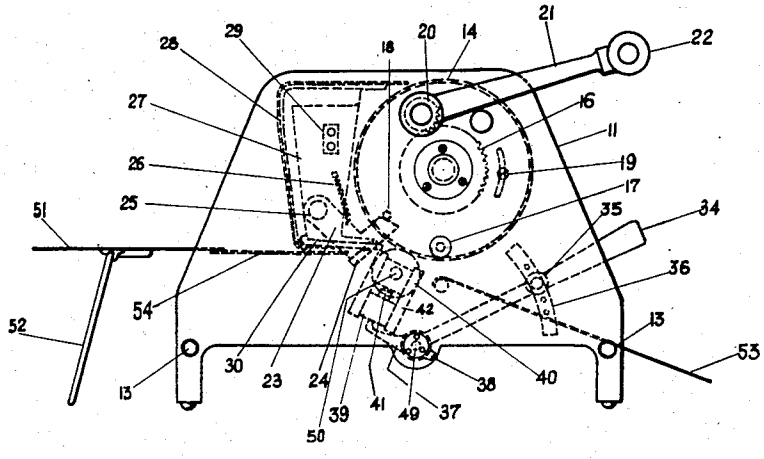


FIG.-2.

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DUPLICATING MACHINE AND METHOD

Filed Dec. 2, 1935 3 Sheets-Sheet 2

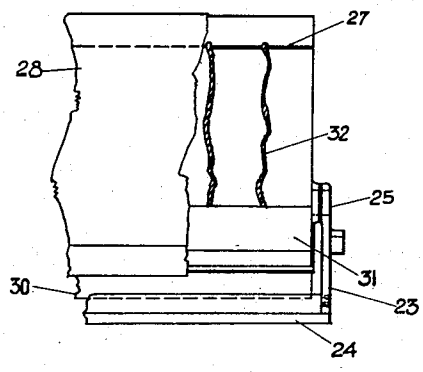


FIG. 3

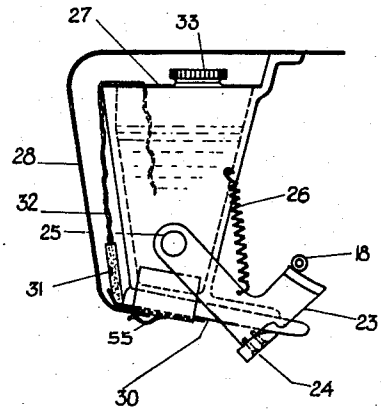


FIG.-4.

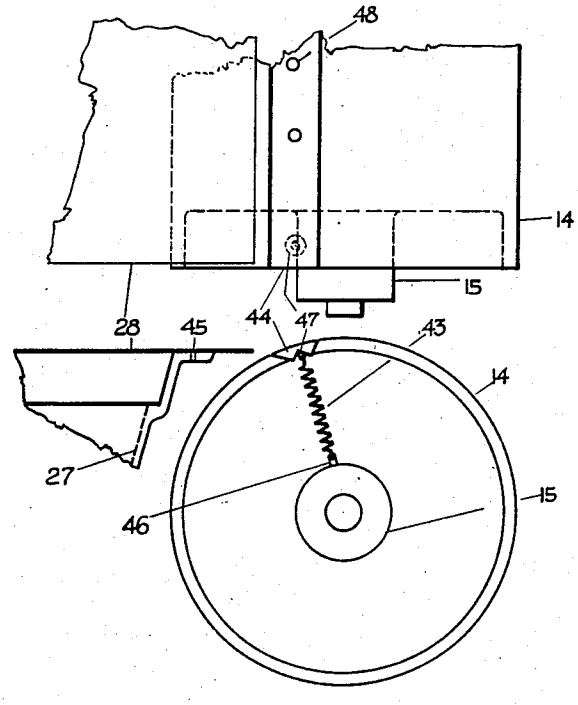


FIG.-5.

FIG.-6.

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DUPLICATING MACHINE AND METHOD

Filed Dec. 2, 1935 3 Sheets-Sheet 3

FIG.-7.

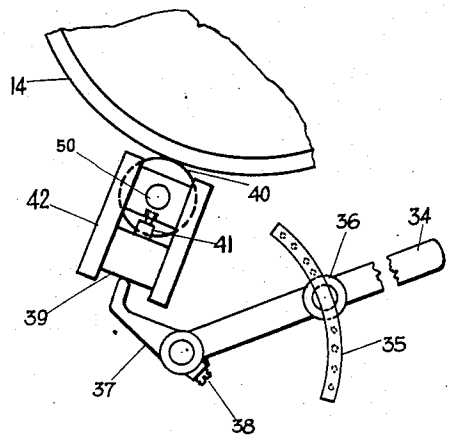
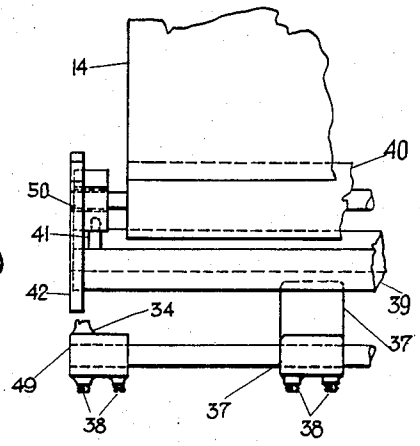


FIG.-8.



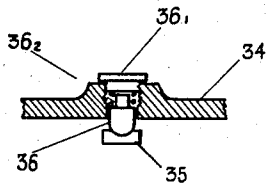


FIG.-9.

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UNITED STATES PATENT OFFICE

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DUPLICATING MACHINE AND METHOD

Ernest M. Terry, Harrison, N. Y.

Application December 2, 1935, Serial No. 52,508

4 Claims. (Cl. 101—132)

This invention relates to the method or process of duplicating printed, written or drawn records made on master copies with copying ink.

In duplicating processes and machines such as are the subject of the invention herein, it is customary to moisten a clear sheet of copying paper with a suitable solvent and to pass such moistened sheet through a compressing medium which process deposits upon the moistened clear sheet a portion of the copying ink from a master copy which passes simultaneously through the compressing medium and in contact with the clear sheet. The machines and processes heretofore developed have several undesirable features.

The methods for moistening the clear sheets do not provide effective control of the amount of liquid deposited and, therefore, furnish non-uniform distribution of solvent and consequent unevenness of duplication. The methods and machines heretofore developed do not permit complete operation from a single operator's position. When a new master copy is to be mounted the operator must do so from the rear of the machine. In addition, many of the existing devices moisten and print upon the underside of the clear sheet, ejecting the reproduction face down. If the sheet is not completely dry the characters may blur.

Some of the objects of my invention are to eliminate the undesirable features of the preceding paragraph and to provide means for uniform moistening of the upper face of the clear sheet and means for mounting the master from the ordinary operator's position.

Other objects of my invention will appear in the detailed description herein and the drawings which accompany the same and in which drawings,

Fig. 1 is a top view of my duplicating machine;

Fig. 2 is a side elevation and shows the general arrangement of the parts thereof;

Fig. 3 is an enlarged partial end detail view of the moistening fluid tank and associated parts;

Fig. 4 is a similar side elevation view;

Fig. 5 is an enlarged top detail view of the master copy holding mechanism;

Fig. 6 is a similar side elevation view;

Fig. 7 is an enlarged side elevation detail view of the pressure roller and associated elements;

Fig. 8 is a similar end elevation view; and

Fig. 9 is a sectional detail view of the pressure bar catch.

In the drawings elements **10** and **11** are the side mounting plates of the stationary frame in which the various parts of the duplicating machine are mounted. The mounting plates are held in position by means of rods **12**, nuts **13** and bosses **29** on tank **27** which tank contains a moistening fluid such as alcohol.

Element **14** is the platen or drum upon which the master copy is mounted. Clamp **44** is arranged so that it may be raised against the tension of spring **43** and a master inserted and clamped in place. Pin **47** in clamp **44** and pin **46** in shaft **15** about which drum **14** rotates serve as means for fastening spring **43**. Clamp **44** may be raised by inserting special pins in openings **48** and exerting pull against spring **43**. Gear **16** is fastened to drum **14** and is driven by gear **20** which in turn is rotated by the operation of lever **21** and knob **22**. Element **17** is a spring click arrangement inserted in mounting plate **11** so that a pin fastened to drum **14** will engage said click when said drum reaches the end of its cycle. Screw **19** is mounted to an arrangement within drum **14** to permit changing the relative positions on shaft **15** of drum **14** and gear **16**. Pin **18** is located in the end surface of drum **14** so that it engages cam lever **23** at the end of the printing cycle.

Cam lever **23** is pivoted on shaft **25** and is retained at its position with stop **24** pressed against moistening pad **30** by means of spring **26**. Pad **30** which is made of a porous and absorbent material such as felt is in contact at one end with pad **31** which is made of a similar material. Pad **31** is fastened to absorbent cords **32** which protrude into the solution in tank **27** through openings in the top. The moistening solution in tank **27** is poured therein through an opening ordinarily closed by cap **33**. Tank cover **28** encloses the tank, moistening cords, etc. and is held in place by means of pins **45** and spring clamp **55**.

Pressure adjusting lever **34** is fastened to shaft **49** at the midpoint of which is also fastened lever **37**. The angular locations of both levers **34** and **37** upon shaft **49** may be altered by means of set screws **38**. Lever **37** presses upon the center of cross bar **39** at both ends of which are mounted pins **41** which engage with bearings **50** movably located in guides **42**. Roller **40** rotates in bearings **50** and is driven by friction with drum **14**. Element **36**, constructed of parts **36**, 36_1, and 36_2, is a click pin arrangement which engages with element **35** so that lever **34** may be retained at any desired position within the arc of element **35**.

Platform **51** serves as a guide for feeding the clear paper into the machine and is retained in its horizontal position by means of support **52**. Element **53** is the platform upon which the duplicate print is ejected upon the completion of the

printing cycle. Platform 54 is an extension of platform 51.

The sequence of operations is as follows. Tank cover 28 and caps 33 are removed permitting tank 27 to be filled with moistening fluid. The fluid is absorbed by capillary action in cords 32 and carried by gravity to pads 31 and 30. The reverse master is placed upon the horizontal surface of cover 28 after caps 33 and said cover are replaced and the end of the master guided into place under clamp 44 so that the inked face is outward. Drum 14 is given one revolution by rotating lever 21 twice, the ratio of gears 16 and 20 being 2 to 1, thereby putting the master copy in place. Screw 19 is loosened and the relative angular positions of gear 16 and drum 14 adjusted so that when the cycle starts from click arrangement 17 the clear paper will advance to the correct position in contact with the master copy.

As drum 14 rotates pin 18 approaches cam lever 23 and depresses said lever until the click position is reached when the pin is at the furthermost counterclockwise point of the cam surface. At this point pressure bar 24 is slightly below pad 30 permitting a clear sheet to be inserted to make contact with the master at the common tangent point of drum 14 and roller 40.

Lever 34 is depressed until the required pressure is transmitted to roller 40 by means of shaft 49, lever 37, bar 39, pins 41 and bearings 50. This pressure may be altered at any time during the operation of the machine to alter the ink deposit upon the clear moistened paper.

The operator then rotates lever 21, by grasping knob 22, in a clockwise direction. A slight movement carries pin 18 from lever 23 and permits bar 24 to rise and press the clear sheet upon pad 30 causing said clear sheet to be moistened. The amount of moisture deposited is initially determined by the number of cords 32 employed. The pressure between roller 40 and drum 14 draws the clear sheet towards platform 53 and in contact with the master. Said pressure causes the master to deposit a definite amount of copying ink upon the clear sheet, thus reproducing the master figures or designs. At the completion of the drum cycle the imprinted sheet is ejected face upward upon platform 53.

When the operator has completed the work cover 28 may be removed and pad 31 swung up and placed on top of tank 27. This prevents a surplus of moisture accumulating in pads 31 and 30. As operation is about to be recommenced pad 31 is replaced and a few moments will suffice to properly moisten pad 30.

The disclosure herein illustrates a preferred embodiment of my invention. It is obvious that other details could be substituted at various points in the machine. For instance, if it is not desired to prevent moisture accumulation and it is satisfactory to remove excess moisture by running several clear sheets without a master, pads 30 and 31 could be combined. This and other possible changes or additions would merely be alternative means of accomplishing the objects of my invention, specifically pointed out in, and limited only by the appended claims.

I claim:—

1. In a duplicating machine of the character described, a tank containing solvent, means for maintaining a uniform and constant capillary flow of said solvent to the upper face of the clear sheet consisting of absorbent pads and absorbent cords controlling the flow of said solvent, means for conveying the moistened clear sheet into contact with a reverse master copy and means for compressing the moistened clear sheet against the master copy to obtain a duplicate copy upon said moistened clear sheet.

2. The method of multiplying copies comprising the forming of a master copy with copying ink in reverse, moistening the upper face of a clear sheet by means of capillary flow through absorbent cords to absorbent pads in contact with said upper face, conveying said moistened clear sheet into contact with the reverse master copy and compressing said moistened clear sheet against the master copy to obtain a duplicate copy upon said moistened clear sheet.

3. In a duplicating machine of the character described, a tank containing solvent, means for maintaining a uniform and constant capillary flow of said solvent to the upper face of the clear sheet consisting of absorbent pads and absorbent cords.

4. In a duplicating machine of the character described, a tank containing solvent, absorbent cords immersed therein and passing through said tank above the solvent level, and absorbent pads moistened by said absorbent cords and in contact with the upper face of the clear sheet.

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