April 7, 1936. F. W. STORCK 2,036,972

APPARATUS FOR DUPLICATING PRINTED MATTER

Filed March 4, 1935 2 Sheets-Sheet 1

Fig. 1.

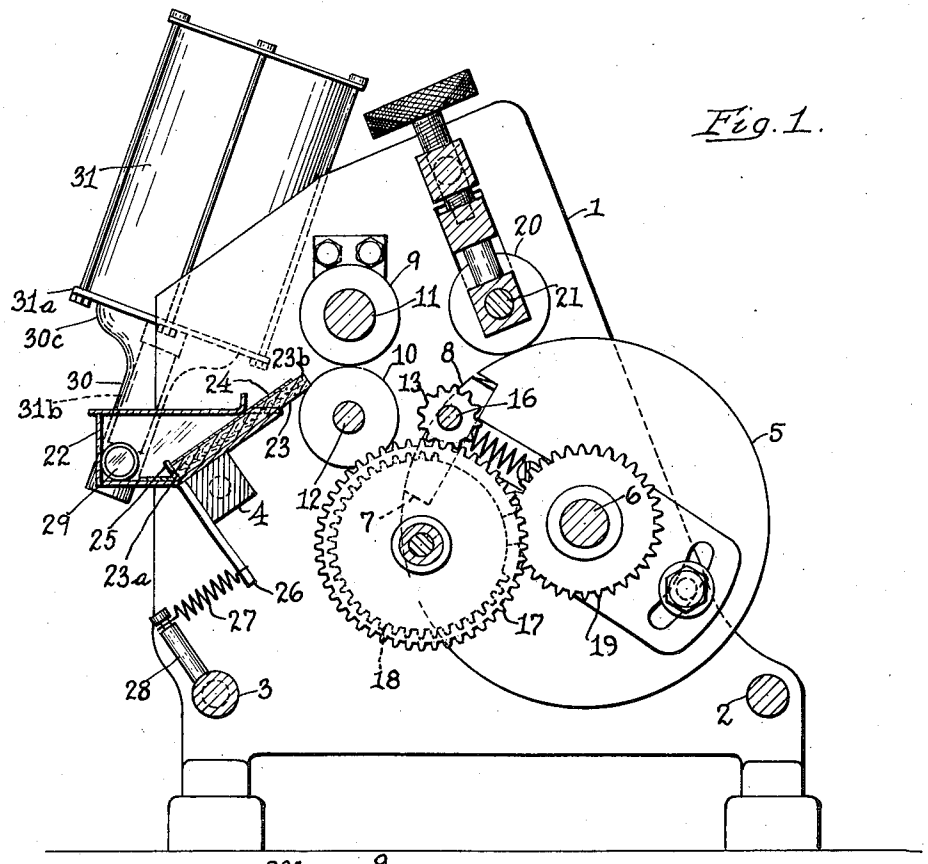
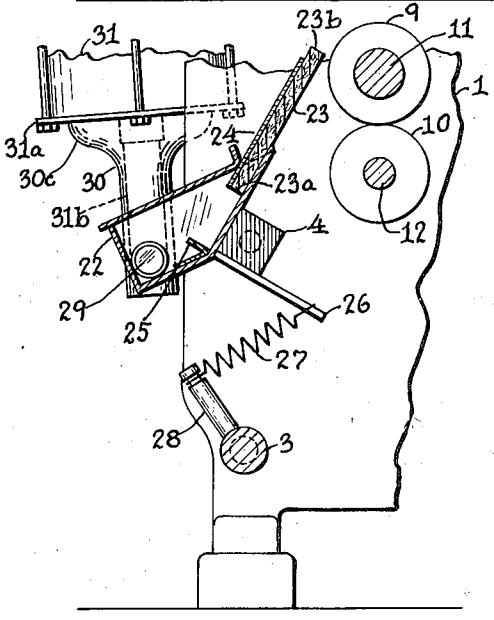


Fig. 2.



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Fig. 3.

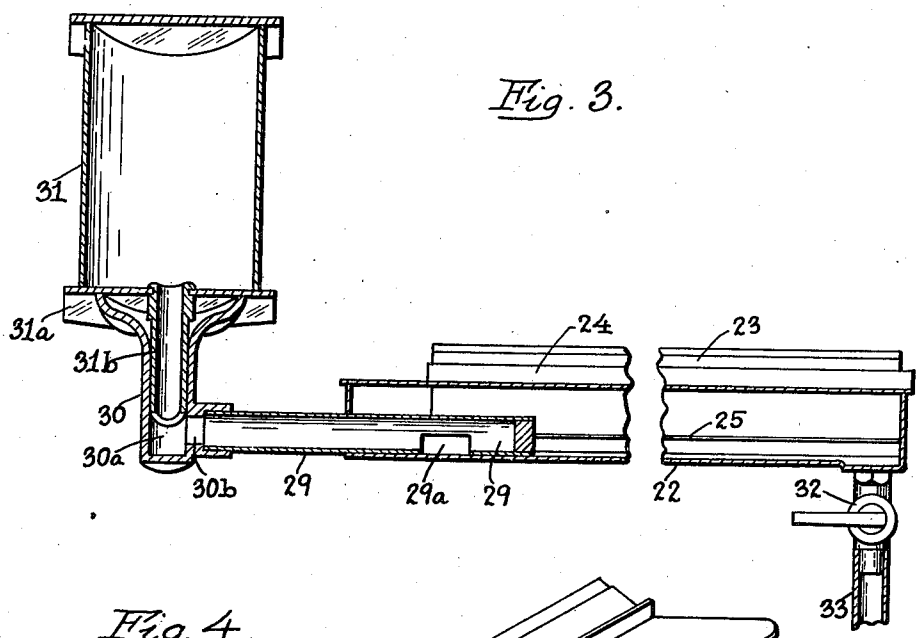


Fig. 4.

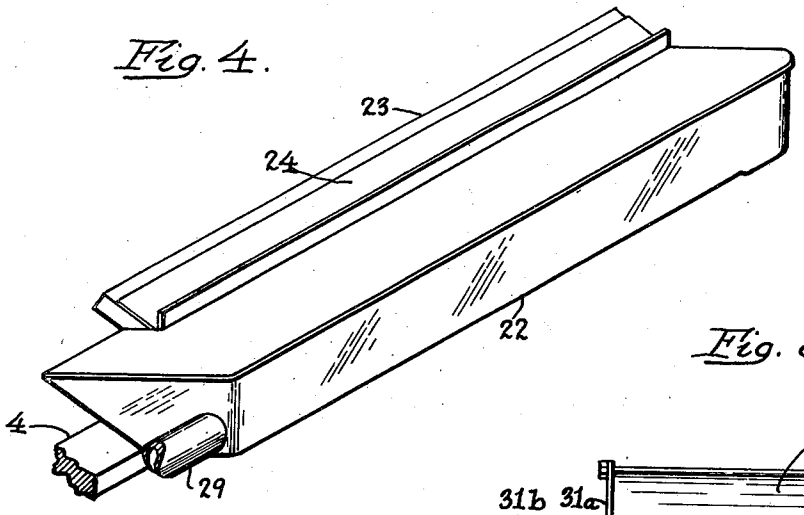
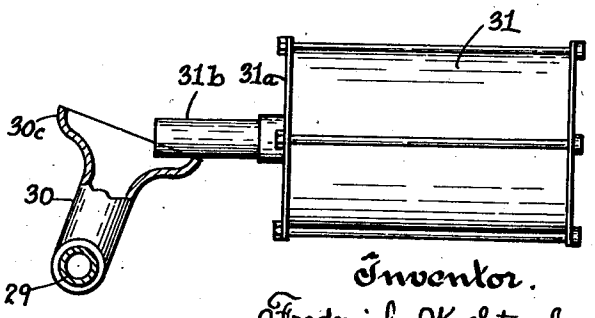


Fig. 5.



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Patented Apr. 7, 1936 2,036,972

UNITED STATES PATENT OFFICE

2,036,972

APPARATUS FOR DUPLICATING PRINTED MATTER

Frederick W. Storck, Arlington, Mass., assignor to Standard Mailing Machines Company, Everett, Mass., a corporation of Massachusetts

Application March 4, 1935, Serial No. 9,151

11 Claims. (Cl. 101—132)

This invention relates to improvements in duplicating machines wherein the record copy or master sheet is made in reverse with suitable copying ink and reproduced therefrom on sheets of paper, or the like, having a moistened face and the invention relates more particularly to an enclosed tank for retaining a predetermined level of liquid therein which is subsequently applied to the sheet by means of capillary action.

In duplicating machines of the character described herein, it is the practice to moisten the clear sheet of paper, or the like, on which the duplicate copy is imprinted by feeding the clear sheet into engagement with means for applying a film of volatile, quickly diffusing, moistening liquid to the surface of the sheet and thereafter engaging the moistened sheet, under pressure, with the master copy. To produce a duplicate copy uniform in appearance, the quantity of moisture applied to the clear sheet must be uniform and evenly distributed over the surface of same, otherwise the copy will be heavy in some places and light in others.

A machine embodying the above general principles of duplicating from a master copy is completely shown and described in my Patent No. 1,964,933, issued July 3, 1934.

In a duplicating machine of the above type the tank is provided preferably with a wick which extends into the tank and by the capillary action of the wick withdraws the fluid from the tank to be subsequently deposited on the sheet. Obviously in using a wick material it becomes necessary to change or renew the wick from time to time, due to the clogging of the wick from impurities in the liquid, or wear.

Accordingly, one of the objects of my present invention is to provide an enclosed tank adapted to maintain a predetermined level of fluid therein, with a wick extending into the tank to engage the fluid and extending therefrom to subsequently deposit the fluid on the surface of a sheet.

A further object of my invention is to construct my tank so that the wick may be easily and readily removed and replaced in a positive position.

A still further object of my invention is to provide a removable, inverted reservoir for a supply of the liquid wherein this reservoir coacts with a tank member to form a valve seal and whereby the supply reservoir is air-locked by the level of the liquid in the tank and further discharge from the reservoir is controlled by this level of liquid.

With the above and other objects in view my invention comprises a novel combination and arrangement of parts hereinafter described and more specifically pointed out in the appended claims.

In the accompanying drawings I have shown my invention embodied with a duplicating machine sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:

Fig. 1 is a transverse section of a part of a duplicating machine having my improvements embodied therewith.

Fig. 2 is a view corresponding to a portion of Fig. 1, but shows parts of my improvement in a different position.

Fig. 3 is a longitudinal section of my tank and reservoir detached from the machine.

Fig. 4 is a perspective view of my enclosed tank and wick elements.

Fig. 5 is a side view of my reservoir partially disengaged from its coacting valve member.

The duplicating machine

The machine as illustrated in the drawings is provided with opposed side frames **1**, only one side of which is shown, in which are mounted the operating elements of the duplicator. The opposed side frames **1** are retained in spaced relation by rods **2**, **3** and **4**. The printing platen **5** is rotatably mounted on the shaft **6** which, in turn, is secured against rotation in the side frames **1**.

The printing platen **5** is provided with a clamping device for holding the reverse master copy clamped between the radial wall **7** and the edge of the clamping segment **8**.

A sheet to be printed upon is fed to contact with the feeding rolls **9** and **10**. The feed roll **9** is provided with a shaft **11** which extends beyond each end to form journals designed to rotate in suitable adjustable bearings in the side frames. The roll **10** is provided with a shaft **12** journaled in suitable bearings in the side frames.

The mechanism for intermittently rotating the printing platen **5** consists of a pinion **13** mounted on a stud **16**, this pinion **13** meshes with and rotates an intermediate gear **17** to which the intermittent gear **18** is secured, this intermittent gear **18** meshes with a coacting intermittent gear **19** which is adjustably secured to the printing platen **5**.

In operation, the gear **17** is rotated in a contraclockwise direction which causes the printing platen **5** to be rotated in a clockwise direction.

The function of the intermittent gears 18, 19 is well known in the art.

The feed rolls 10 and 11 are intermittently rotated in direct relation to the printing platen 5 by gear connections not shown.

The printing platen pressure roll 20 is formed upon the shaft 21 which is journaled at its ends in suitable bearings.

The above parts and their respective functions are clearly shown and described in my above referred to patent, therefore further detailed description is thought unnecessary.

Capillary feeding tank and fluid reservoir

My improved means for feeding the moistening fluid embodies a substantially enclosed tank 22 which extends between the side frames 1. The tank 22 is secured to a spacing bar 4 which is adapted for rotation in suitable bearings in the opposed side frames 1.

The tank 22 is provided adjacent its top with a longitudinal slot in which is frictionally disposed a wick 23 and backing plate 24. A stop 25 is provided within the tank 22 to properly position and retain the inner longitudinal edge 23*a* of the wick and backing plate 24 relative to the fluid level in the tank and the roll 10.

The spacing bar 4 is provided with a depending arm 26 to which is secured one end of a pull spring 27. The opposed end of said pull spring 27 is attached to a fixed stud 28 secured in the spacing bar 3. This pull spring 27 causes the outer longitudinal edge 23*b* of the wick to engage the peripheral face of the roll 10 with a degree of pressure, the portion of the backing plate 24 extending out from the tank acts as a stiffener for the roll engaging edge 23*b* of the wick.

When it is desirable to replace the wick 23 the tank 22 may be rotated, see Fig. 2, from its engagement with the roll 10 to a position where the wick and plate 24 may be readily withdrawn and replaced free from the obstructing path of the feed rolls 10 and 11.

In this instance, my enclosed tank 22 is provided with a conduit 29 which extends longitudinally within the tank. This conduit is provided with a positively positioned outlet 29*a* set to control the level of the liquid within the tank, as will be hereinafter more fully explained. In my present construction the conduit 29 extends from within the tank 22 and has a reservoir supporting member 30 secured to the outer end thereof. The member 30 is provided with a bore 30*a* which is connected, by means of an opening 30*b*, with a tank conduit 29. The upper portion of the member 30 is preferably of a bell-mouth contour to provide a bearing support for the end 31*a* of the inverted fluid reservoir 30. Also, this bell-mouth portion deters the spilling of liquid, about the member 30, when the spout 31*b* of the reservoir 31 is moved or replaced within the bore 30*a* of its supporting member. And further, this bell-mouth acts as a convenient guide in replacing the spout within the bore.

My inverted reservoir may be of any suitable construction or material having a suitable spout 31*b* which may be adapted to engage in the bore 30*a* of the support in a suitable manner to form a seal with the liquid.

Fluid supply and feeding operation

In the operation of my fluid feeding device, the reservoir 31 is removed and filled with a liquid through the spout 31*b*; the spout 31*b* is then positioned in engagement with the edge of the bell-mouth 30*c*, see Fig. 5. This permits the operator to quickly invert the reservoir and guide the spout 31*b* into the bore 30*a*. When the reservoir 31 has been placed in its inverted operative position, see Fig. 3, the fluid passes through the opening 30*b*, conduit 29, and conduit opening 29*a* into the tank 22.

As the fluid level rises in the tank, to the height of the conduit opening 29*a*, this opening will become sealed, thus causing the fluid supply in the reservoir to be air-locked. When the fluid is drawn from the tank, by the capillary action of the wick, and utilized in moistening the sheets, to a point relative to the height of the conduit opening 29*a*, air will be introduced into the fluid supply sufficient to temporarily break the air lock of the fluid and thereby replenish the fluid in the tank 22 to its normal level and which again effects an air lock of the fluid supply.

When it is desired to discontinue the use of the machine it is obviously desirable to remove the liquid in the tank to prevent evaporation and waste, therefore, I have provided my tank with an outlet valve 32. This valve 32 is adapted to receive a conduit 33 of a suitable or desired length.

As has been pointed out, my reservoir 31 is readily removable. Upon discontinuation, the operator removes the reservoir 31 with its remaining contents; inserts the conduit 33 in the spout 31*b*; opens the valve 32 and permits the fluid then contained in the tank, and conduits leading thereto, to drain into the reservoir or other suitable container.

It should be particularly noted that the function of replacing the feed wick, replenishing the fluid, and draining the fluid from the tank, can, in each instance, be accomplished without the removal of the tank 22 itself from the machine.

From the foregoing, it is obvious that many rearrangements of parts might be accomplished by those skilled in the art, therefore, I do not wish to be limited to the specific arrangement and construction herein disclosed, but what I claim is:

1. A moistening device for duplicators comprising a substantially closed fluid tank adapted to maintain a predetermined level of liquid in said tank, an air-locked reservoir for supplying liquid to said tank, a longitudinal opening in one edge of said fluid tank adapted to support a fibrous material, said material extending into said tank against a positive abutment and projecting beyond the opening edge thereof for the purpose set forth.

2. A moistening device for duplicators comprising a substantially closed fluid tank adapted to maintain a predetermined level of liquid in said tank, an air-locked reservoir for supplying liquid to said tank, a longitudinal opening in one edge of said fluid tank, said opening being adapted to frictionally engage and retain a readily replaceable fibrous material, said material projecting beyond the outer edge of said tank and extending inwardly against a positive stop to contact fluid contained in said tank for the purpose set forth.

3. A moistening device as set forth in claim 2 wherein the fibrous material is provided with a backing plate and wherein said plate and material are relatively positioned and frictionally engaged in said opening.

4. A moistening device for duplicators comprising a substantially closed fluid tank having a longitudinal slot adjacent its top, a bibulous material disposed within said tank and extending therefrom through said slot, a normally air-

locked reservoir for supplying liquid to said tank, said reservoir being disposed above the plane of said tank, fixed means disposed relative to said tank and reservoir whereby said air-lock is broken to supply said tank with a predetermined amount of liquid.

5. A moistening device for duplicators comprising a substantially closed fluid tank having a longitudinal slot adjacent its top, a bibulous material disposed within said tank and extending therefrom through said slot, a removable reservoir for supplying liquid to said tank, a conduit disposed between said reservoir and tank, a fixed communicating opening, disposed between said conduit and the inner chamber of said tank, whereby the supply of liquid in said tank will cause said supply reservoir to become air-locked.

6. A moistening device for duplicators comprising a substantially closed liquid tank, a bibulous material disposed within said tank and extending therefrom, a liquid supply reservoir, a conduit connecting said reservoir and tank for feeding liquid to said tank by gravity, a fixed aperture disposed relative to said conduit whereby said liquid supply is air-locked by the liquid level in said tank.

7. A moistening device for duplicators comprising a substantially closed liquid tank, a bibulous material disposed within said tank and extending therefrom, a conduit connected to said tank, said conduit having an angularly disposed terminating portion, a fluid reservoir for supplying liquid to said tank by gravity, said reservoir having a portion adapted to engage with said first portion in a substantially close relation to form a seal, a fixed aperture disposed relative to said conduit to control the level of liquid in said tank and subsequent replenishment from said reservoir.

8. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse in copying ink on a master sheet, means for moistening the face of a clear sheet which comprises a pivotal substantially enclosed tank having set means for maintaining a predetermined amount of quick diffusing and rapid drying solvent therein, an applicator disposed relative to said tank, and capillary means for conveying the solvent from the tank to said applicator to distribute the solvent to the face of a clear sheet, an air-locked reservoir for supplying solvent to said tank with means whereby said air lock is automatically broken when the solvent level in said tank is diminished and whereby said air lock is automatically effected by the predetermined solvent level in said tank.

9. A duplicating machine as set forth in claim 8 wherein the reservoir may be separated from the tank at will.

10. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse in copying ink on a master sheet, means for moistening the face of a clear sheet which comprises a pivotal substantially enclosed tank having set means for maintaining a predetermined level of quick diffusing and rapid drying solvent therein, an applicator disposed relative to said tank, and capillary means for conveying the solvent from the tank to said applicator to distribute the solvent to the face of a clear sheet as it passes said applicator, pressure means for said solvent conveying means, an air-locked reservoir for supplying solvent to said tank with means whereby said air lock is automatically broken when the solvent level in said tank is diminished and whereby said air-lock is automatically effected by the predetermined solvent level in said tank.

11. A duplicating machine as set forth in claim 10 having positively positioned solvent conveying means frictionally retained relative to said tank.

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