Nov. 17, 1936. F. W. STORCK 2,061,526

MOISTENING AND FEEDING DEVICE FOR DUPLICATORS

Filed May 20, 1935

Fig. 1.

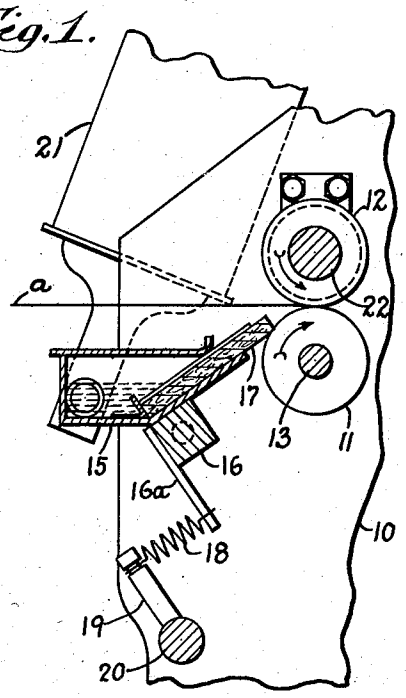


Fig. 4.

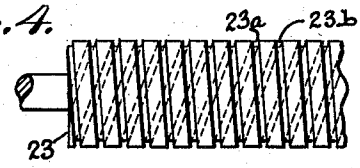


Fig. 5.

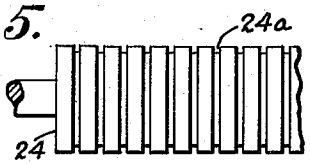


Fig. 6.

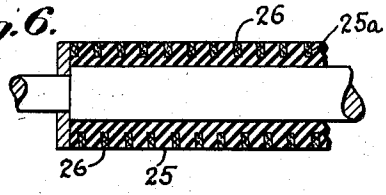


Fig. 2.

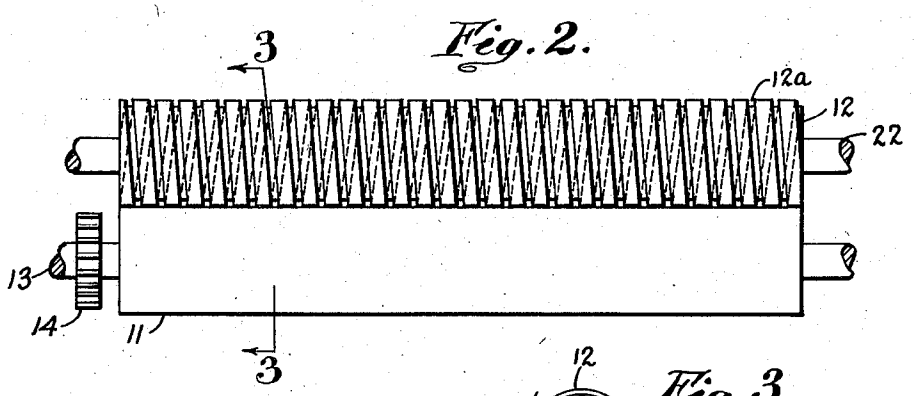


Fig. 3.

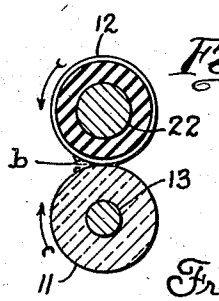
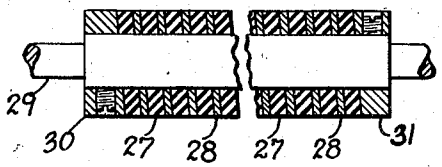


Fig. 7.



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2,061,526

MOISTENING AND FEEDING DEVICE FOR DUPLICATORS

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Application May 20, 1935, Serial No. 22,442

12 Claims. (Cl. 101—132)

This invention relates to improvements in duplicating machines wherein a record copy or master sheet is made with ink characters in reverse with a suitable copying ink and duplicate copies reproduced therefrom on sheets of paper, or the like, having a moistened face, and my invention relates more particularly to a novel construction of coacting feed and moistening rolls adapted to simultaneously feed and uniformly moisten the face of the sheet to be printed upon.

The field to which the above method of duplicating may be applied, in an economical and efficient manner, may be greatly expanded and accommodated to various manufacturing systems and requirements. Heretofore, this method of duplicating has been generally limited as to its practicability and efficiency to reproduce on sheets of paper, and the like, having a flat, regular surface.

The moistening of the face and feeding of the sheets to be duplicated upon, such as, for example, a tag or strip of tags having a reinforced eyelet and a requirement for receiving characters in close proximity thereto, presents a problem in properly moistening the complete face of the unit and feeding these various thicknesses or irregularities in the face plane of the sheet or tag.

A duplicating machine of the herein referred to character is fully shown and described in my United States Letters Patent No. 1,964,933, issued July 3, 1934. One method and device for moistening and feeding a clear sheet to be printed upon is shown and described in my United States Letters Patent No. 1,988,056, issued January 15, 1935.

In the moistening of the clear sheet it is obviously desirable to uniformly moisten the entire area of the face of the sheet which is to be printed upon. To obtain this desired result, it is essential to control the moisture supplied to or carried by the moisture applicator. Excessive moisture collected by or on the applicator will moisten the advancing edge face portion of the sheet to an undesirable degree for uniform results. This excessive moisture accumulation frequently occurs when the moistening and/or feeding elements remain in direct contact with one another when rotating idly.

I am aware that heretofore moistening and feeding means have been devised wherein the moistening element has been constructed so as to be moved into a disengaging relation relative to the feed plane of the clear sheet and to again move, in a timed relation, into an engaging position to moisten the face of an advancing sheet. Devices of this particular character require that the sheet be properly positioned against stops or, through other means, indicate for the actuation of the moistening device into an engaging path.

This necessitates the positioning of the advancing edge of the sheet beyond the moistening element with the result that a wide margin, adjacent the advancing edge, is not provided with moisture and, therefore, cannot receive a duplicate impression from the master. Also, a device of this character requires an additional mechanical movement with its attendant parts and connections which would be further complicated by a requirement for various automatic intermittent periods of operation as would be necessary for operating on a strip of tags as above described, if the destructive characteristics of the reinforced eyelets, against the moistening element, were to be avoided.

My above referred to Patent No. 1,988,056 shows a device embodying coacting absorbent and non-absorbent rolls for moistening and feeding the clear sheets and also eliminating the hereinbefore referred to accumulation of moisture. This device is preferable for feeding clear sheets having uniform thickness and a regular plane. Also, the advancing edge portion of the sheet is uniformly moistened with this construction, thereby presenting a completely moistened face to be duplicated upon, thus avoiding unnecessary waste space.

In this last device the absorbent roll prevents an accumulation of moisture at the bight of the rolls, thereby preventing excessive moisture being applied to the advancing edge face portion of the sheet. While this last referred to device has desirable features and permits of the rolls remaining in an engaging relation one with the other, irrespective of periods, the material of which a roll of this character is constructed would permit of damage, due to the matting of the material, where the above mentioned tags or card-like material is continuously fed between the rolls. Continued feeding of the reinforced tag eyelets would cause grooves to form in the face of the absorbent roll and thereby impair its use and necessitate frequent replacement. Also, card-like material of a less width than the rolls would have a damaging effect.

Accordingly, the object of my present invention is to provide a paper feed and moistening device of a simple and efficient construction whereby the face of a sheet, or the like, having a

regular or irregular face plane may be fed and uniformly moistened simultaneously.

Another object in my invention is to provide a pair of coacting non-absorbent feed and moistening rolls that will prevent an excessive accumulation of moisture at the bight of the rolls and thereby permit them to remain in contact with one another at all times.

A further object in my invention is to provide a pair of feed and moistening rolls that will operate efficiently on either a regular or irregular surface for an extended period of time without impairing the rolls or their efficiency.

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

Although not limited thereto, in the accompanying drawing I have shown my invention embodied with a duplicating machine, of a type fully shown and described in my above referred to patent, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawing:

Fig. 1 is a sectional elevation of a portion of a duplicating machine side frame having my combined moistening and feeding device embodied therewith.

Fig. 2 is a front elevation of my moistening and feed rolls.

Fig. 3 is a transverse section taken substantially along line 3—3, Fig. 2.

Fig. 4 is a modification of my grooved or recessed roll shown at Fig. 2.

Fig. 5 shows still another modification of the peripheral face interruptions for one of my rolls.

Fig. 6 is another modification for the forming of the peripheral face of my improved roll, and

Fig. 7 shows a method of forming a roll so as to provide my desired peripheral face.

The duplicating machine

A duplicating machine of the type, of which a portion is illustrated in the drawing, is provided with opposed side frames 10, between which the operating elements of the duplicator are mounted. A duplicating machine of this referred to type and adapted to embody my present invention is completely shown and the respective functions of the required elements described in my Patent No. 1,964,933, therefore, a detailed showing and description of the duplicating machine proper is thought to be unnecessary.

Moistening and feeding device

The sheet *a* to be printed upon is fed from a suitable table or support, not shown, and positioned in engagement with the bight of the coacting moistening and feed rolls 11, 12. The moistening roll 11 is provided with a shaft 13 journaled in suitable bearings in the opposed side frames. This roll shaft 13 has secured thereon a pinion 14 which engages with a gear secured to the usual printing platen and thereby, the moistening roll is rotated in a direct relation to said printing platen.

In this instance, I have illustrated a barometrically controlled fluid supply tank 15 which extends between the side frames and is secured to a spacing bar 16 which is adapted for rotation in suitable bearings in the opposed side frames. The tank 15 is provided with a wick 17 which extends within the tank and projects therefrom to engage with the peripheral face of the moistening roll 11.

The spacing bar 16, to which the tank 15 is secured, is provided with a depending arm 16*a* to which is secured one end of a pull spring 18. The opposed end of said pull spring 18 is attached to a fixed stud 19 secured in the frame spacing bar 20. This pull spring 18 causes the outer longitudinal edge of the wick 17 to be pressed into engagement with the peripheral face of the moisture applicator roll 11. Also, this spring 18 permits the tank 15 to be rotated outwardly and away from the applicator roll 11 and thereby permits unobstructed removal and replacement of the wick 17.

Fluid is supplied to the tank 15 from a reservoir 21 and the level of fluid in the tank is controlled by barometric action as described in the above referred to patents and my co-pending application, Serial No. 9,151.

The moistening and feed rolls

In using a non-absorbent or impervious roll having a contiguous face and coacting with a like roll, to which moisture is applied, moisture will accumulate at the bight of the rolls, as indicated at *b*, Fig. 3, when the rolls are rotated in engagement with one another and without a sheet disposed therebetween.

As a subsequent sheet is positioned in engagement with the bight of the rolls, this accumulation of fluid will be deposited on the advancing end surface of the sheet and excessively moisten that area, thereby producing unsatisfactory results on the copy and injurious results to the master, by presenting too much moisture.

I have found that by interrupting the non-absorbent line of contact at the bight of the rolls, moisture normally accumulated at this point can be controlled or dispersed.

To eliminate the disadvantages due to this accumulation, I prefer to use an upper feed roll 12 of a resilient material, such as rubber, which is mounted on a suitable shaft 22 and journaled in suitable adjustable bearings, and the roll 12 yieldingly retained in engagement with a coacting non-yielding, non-corrosive roll 11.

The continuity of the peripheral face of this upper feed roll 12 may be interrupted in various ways and one form may be accomplished by a continuous narrow spiral groove 12*a* extending longitudinally of said roll as shown at Fig. 2. A variation of this spiral groove is illustrated at Fig. 4, wherein the peripheral face of the roll 23 is provided with a plurality of spirals 23*a*, 23*b*. It is obvious that many modifications may be made as to the forming and arrangement of the peripheral face grooves or recesses and, as illustrated at Fig. 6, the roll 24 may be provided with a plurality of circumferential grooves 24*a*.

With the above type of grooved or recessed roll and modifications thereof, which form openings at the bight of the rolls, fluid accumulation at the bight of the rolls, as illustrated at Fig. 3, will be dispersed and passed through these openings to the opposite side of the roll from which the moisture is applied. As the moistening and feed rolls 11, 12 are rotated, in their feeding operation, in the direction of the arrows, it is obvious that moisture, on the side of the roll bight, opposite to that first contacted by an advancing sheet, will not be deposited on the sheet, as this area of the moistening roll 11 will first contact with the wick 17 and the moistening film on the roll 11 controlled accordingly.

I have also found that my desired results may be obtained by forming grooves **25a** in my roll **25** and inserting therein a bibulous material **26**. This bibulous material **26** may be inserted and secured in grooves or recesses in the peripheral face of the roll in various well known ways, as is obvious, to form a contiguous, or substantially so, peripheral roll face. The bibulous material will readily absorb and dissipate moisture which accumulates at the bight of the rolls.

At Fig. 7 I have illustrated a roll which is formed by alternate discs of resilient material **27** and bibulous material **28** which are mounted on a roll shaft **29** between opposed end collars **30**, **31**. The developed peripheral face of this roll will present alternate resilient and absorbent areas and will function the same as my modification illustrated in Fig. 6, except with a greater absorptive area.

Having thus described my invention and a preferred embodiment thereof, what I claim is:

1. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying coacting feed and moistening rolls with means for conveying moisture to one of said rolls, spaced capillary means embodied with the other roll whereby moisture accumulation at the bight of said rolls is controlled.

2. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying coacting feed and moistening rolls with means for conveying moisture to one of said rolls, spaced capillary means embodied with the other roll whereby moisture accumulation at the bight of said rolls is dissipated.

3. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying coacting feed and moistening rolls with means for conveying moisture to one of said rolls, spaced bibulous areas disposed in the peripheral face of said other roll whereby moisture accumulation in the bight formed by the rolls is controlled.

4. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying coacting feed and moistening rolls with means for conveying moisture to one of said rolls, the other of said rolls having a combined alternately spaced resilient and absorbent peripheral face and whereby said absorbent area limits moisture in the bight formed by said rolls.

5. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying coacting feed and moistening rolls with means for conveying moisture to one of said rolls, the other of said rolls having an alternately spaced resilient and absorbent peripheral face section.

6. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying a non-yielding, non-absorbent roll with means for conveying moisture to said roll, a resilient feed roll coacting with said first roll, said last roll having an alternately spaced absorbent peripheral face area.

7. Combined sheet feeding and moistening means for a duplicating machine having a master copy drum and a pressure roll coacting therewith, said feeding means comprising a dampening roller and a coacting roller having an interrupted face and means for conveying moisture to said dampening roller.

8. Combined sheet feeding and moistening means for a duplicating machine having a master copy drum and a pressure roll coacting therewith, feeding means comprising a dampening roller and a coacting roller having a grooved face and means for conveying moisture to said dampening roller.

9. In a machine for printing on a clear sheet a duplicate of the matter imprinted in reverse with copying ink on a master sheet, a moistening device for said sheet, said moistening device embodying coacting feed and moistening rollers with means for conveying moisture to one of said rollers, said coacting roller being provided with channels on its peripheral face which are angularly disposed relative to the longitudinal peripheral line of contact with said first roller.

10. In a duplicating machine of the character specified, a moisture applicator with means for conveying moisture to said applicator, an intermittently rotatable element associated with said applicator, said element having an interrupted peripheral face adapted to coact with said applicator.

11. In a duplicating machine of the character specified having an intermittently rotatable moisture applicator with means for conveying moisture to said applicator, a rotatable element associated with said applicator, said element having a channel extending spirally along the peripheral face thereof.

12. In a duplicating machine of the character specified having an intermittently rotatable impervious moisture applicator, with means for conveying moisture to said applicator, a resilient pressure roll engaging and actuated with said applicator, said pressure roll having a channeled peripheral face.

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