

No. 638,899.

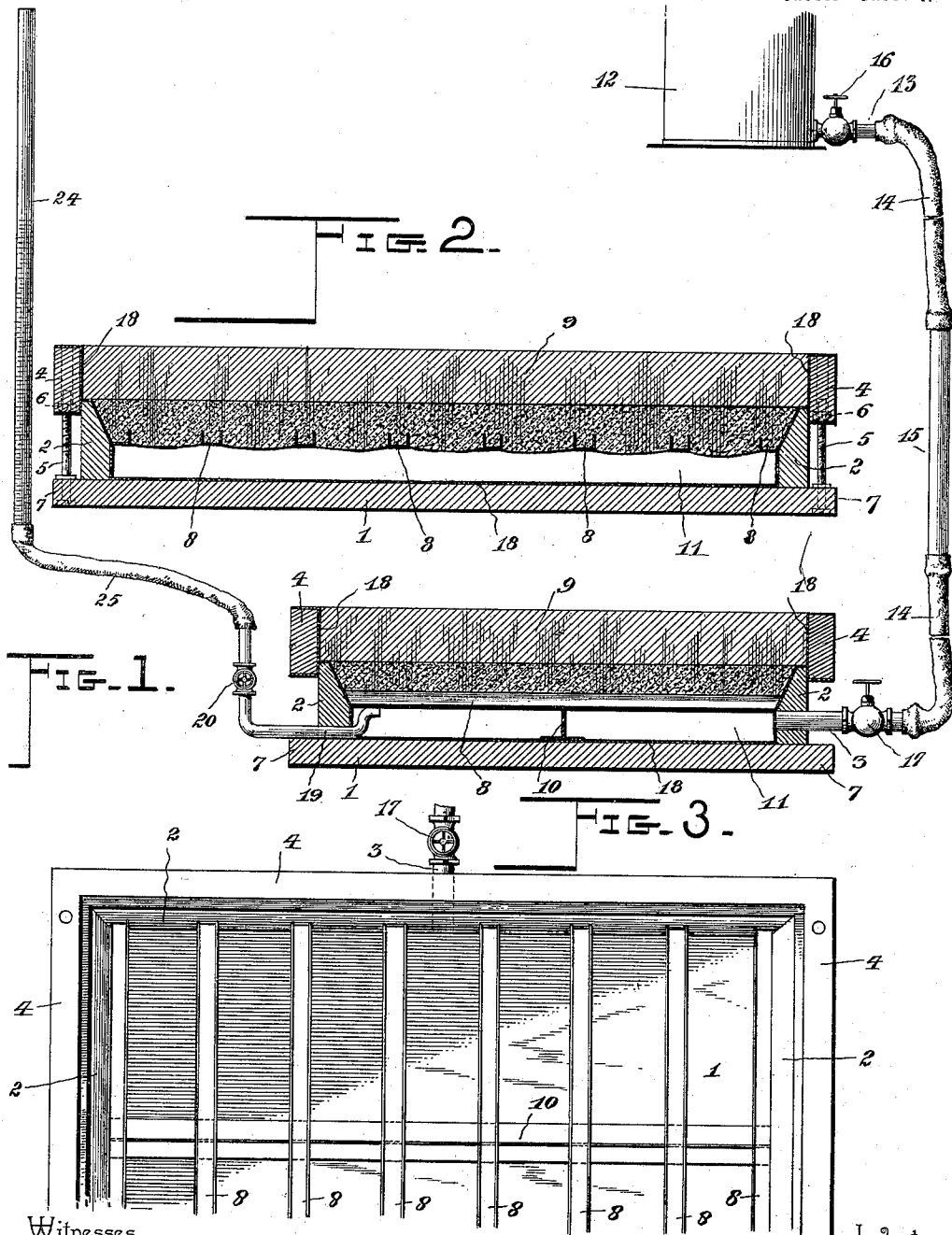
Patented Dec. 12, 1899.

F. H. WOLEVER.  
COPYING APPARATUS.

(Application filed Nov. 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
*John T. Deufferwiel*  
*[Signature]*

By *his* Attorneys,

*Frank H. Wolever,*

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2 Sheets—Sheet 2.

FIG. 4.

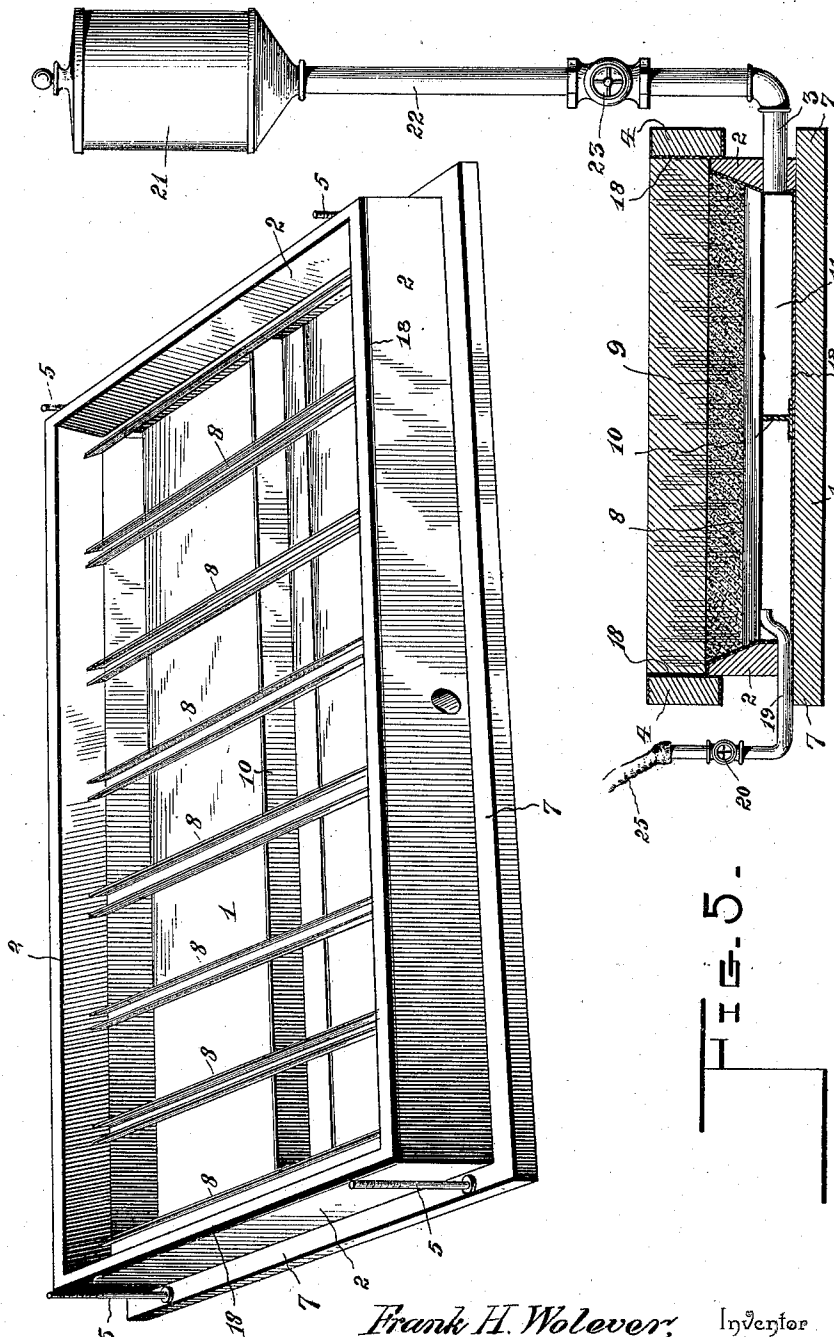


FIG. 5.

Witnesses

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# UNITED STATES PATENT OFFICE.

FRANK HENRY WOLEVER, OF LAFAYETTE, INDIANA, ASSIGNOR OF ONE-HALF TO JOHN S. DRIVER, OF RIVERSIDE, ILLINOIS.

## COPYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 638,899, dated December 12, 1899.

Application filed November 21, 1898. Serial No. 697,049. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK HENRY WOLEVER, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, have invented a new and useful Copying Apparatus, of which the following is a specification.

My invention relates to a copying apparatus including a pad designed to receive the impression of printed or written characters in suitable copying-ink or other transferable impression material; and the object in view is to provide an apparatus of this class wherein a hard and proportionately-durable pad or impression-surface may be used, said surface being maintained in the proper condition for transferring an impression by a continuous supply of moisture.

A further object of the invention is to provide in an apparatus of the class to which my improvement appertains a porous impression-pad of which the surface is accessible by a moistening agent by reason of porosity of the pad.

A further object of the invention is to provide simple and efficient means for applying a continuous supply of surface-moistening material to the rear side of an impression-pad and in connection therewith to provide means for efficiently supporting the impression-pad to render its rear surface accessible to a surface-moistening liquid and for relieving the rear surface of the pad of accumulations of air.

A further object of the invention is to provide means for varying the relative positions of the impression-surface of the pad and the upper edges of the walls of the frame or holder in which the pad is located to insure the efficient exposure of the impression-surface as said surface becomes worn by continued use.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view of a copying apparatus constructed in accordance with my invention, the copying-pad holder being shown in central transverse section. Fig. 2 is a longitudinal sectional view of the pad-

holder. Fig. 3 is a partial plan view of the pad-holder. Fig. 4 is a view of a portion of the pad-holder, the pad and filling being omitted. Fig. 5 is a sectional view of the holder and pad, showing a slightly-modified construction of liquid-feeding devices.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

The apparatus embodying my invention includes a pad-holder having a base or bottom 1 and fixed wall-sections 2, one of which is tapped for the reception of a feed-pipe 3, which communicates with the interior of the holder, and movable wall-sections 4, mounted parallel with the fixed wall-sections for adjustment toward and from the plane of the base or bottom and held in place by means of adjusting-bolts 5, which are threaded into nuts 6 in the movable sections and are swiveled in terminal flanges 7 of the base or bottom. Located transversely in and spanning the holder, with their extremities fixed to the fixed side wall-sections, are supports 8, preferably channeled in their upper surfaces and being adapted to uphold a copying-pad 9, which is arranged in the portion of the holder above the plane thereof. These transverse pad-supports may be braced between the planes of said fixed side wall-sections by means of a longitudinal cross-sectionally T-shaped web 10 to prevent sagging of said supports. The transverse supports 8 divide the interior of the holder into an upper pad-receiving chamber, in which the above-mentioned pad 9 is seated, and a lower or sub-jacent distributing-chamber 11, to which a moistening liquid is fed, the function of this distributing-chamber being to convey liquid introduced therein throughout the area of the pad-holder, and thus communicate moisture to all portions of the under or rear surface of an absorbent pad 9<sup>a</sup>, which rests upon the supports 8 and is interposed between the same and the under surface of the printing or transferring pad 9, said absorbent pad 9<sup>a</sup> being of porous material, such as plaster-of-paris.

The pad 9 is of porous or interstitial mate-

rial, whereby moisture in contact with the under or rear surface thereof is absorbed and conveyed through the thickness of the pad to its operative or upper surface to preserve in a working condition any impression material, such as ink, which may have been applied thereto by any of the well-known processes followed in copying, such as by applying to said surface a letter or other sheet whereon characters are written or printed in a transferable or copying ink or medium. In practice I have found that an efficient printing-pad having a desirable durability and providing a surface of the necessary hardness may be formed by combining plaster-of-paris, silicate of aluminium, and prepared chalk, the proportions of which, however, may be varied to produce corresponding variations in the quality of the surface and the rapidity of absorption of moisture by the pad. The under surface of the printing-pad is arranged in contact with the upper surface of the absorbent pad 9<sup>a</sup>, whereby there is a direct communication of moisture from the latter to the former, and by providing for a continuous supply of moisture to the distributing-chamber 11 a corresponding continuous supply will reach the upper or operative surface of the printing-pad, and thus will maintain the impression of printed or written characters upon said surface in a suitable condition for transfer to a sheet or other surface brought into contact with that of the pad.

Various means may be employed for providing a continuous supply of moisture; but that which I have found to be effective in practice includes a supply-tank 12, with which communicates a supply-pipe 13, connected with the inlet-pipe 3 by interposed flexible sections 14 of rubber tubing or the equivalent thereof and a transparent gage-tube 15, said flexible sections 14 serving to connect the opposite ends of said gage-tube respectively with the supply and inlet pipes 13 and 3; also, the supply-pipe is preferably provided with a controlling-valve 16, whereby a quantity of liquid may be introduced from the tank into the connecting-pipe, and the inlet-pipe 3 is provided with a controlling-valve 17, whereby the communication of liquid from the pipe to the receiving-chamber of the holder may be regulated; said gage-tube serving to show the elevation of the surface of liquid in said connecting-pipe or conveyer and indicate when the tank requires replenishing. The tank may be arranged in any convenient position, as upon a shelf or bracket, and the flexibility of the intermediate sections of the connecting-pipe allows the holder to be arranged in the desired position, and, furthermore, the valves which are arranged in the pipe-sections 13 and 3 provide for the disconnection of the tank from the connecting-tube and also the disconnection of the tube from the pipe 3 without interfer-

ing with the operation of the pad and holder when, for instance, it is desired to refill the tank.

A suitable moistening liquid for supply to the pad during the printing or copying operation consists of water and glycerin approximately in equal parts; but it will be understood that I do not desire to be limited to this particular moistening liquid, as others adapted to the particular impression mediums or inks may be employed in connection with an apparatus constructed in accordance with my invention.

The operation of copying by means of the improved apparatus is substantially the same as that ordinarily followed, in that it involves the contact with the copying-surface of a sheet or surface bearing the printed or written characters to be copied and the subsequent application to the same surface of sheets which are to receive the impression; but it will be understood that by reason of the continuous supply of moisture the copying operation may be continued as long as there is a vestige of copying medium or ink upon the surface of the pad, said medium or ink being prevented from drying, and hence being maintained in a proper condition for transfer. As the impression-surface of the pad becomes worn by continued use the movable wall-sections 4 may be lowered to correspondingly change the relative positions of the upper edges of said walls and the surface of the pad, whereby said surface is exposed to facilitate the application of sheets thereto. Furthermore, in practice I prefer to provide the interior of the holder, inclusive of the surfaces of the fixed and movable sections and the base or bottom, with a lining 18, of zinc or equivalent material, designed to prevent the absorption by the members of the holder or frame of moisture introduced into the distributing-chamber of the apparatus.

When the moistening liquid is introduced into the distributing-chamber for the first time, it is obvious that air contained in the interstices or spaces between the granules or particles of the filling material must be expelled in order to allow an efficient contact of such liquid with the under surface of the pad, and in order to provide for this escape of air I employ an air-outlet tube 19, having its inlet end located contiguous to the plane of the under surface of the absorbent moisture-conveying pad 9<sup>a</sup> and its outlet end upturned exteriorly of the holder to discharge the air as the chamber fills, as clearly shown in Fig. 1, said outlet-tube being provided with a suitable controlling-valve 20. This air-outlet tube, however, has another and more important function, consisting in controlling the pressure applied to moistening liquid in the distributing-chamber. To adapt the outlet-tube to perform this function, a vertical transparent gage and pressure-tube 24 is con-

hected, as by a flexible tubing 25, with the outlet end of the tube 19, and when the moistening liquid is admitted to the distributing-chamber from the tank after all of the air has been expelled from said distributing-chamber said liquid rises into the pressure-tube 24. If the flow of liquid is allowed to continue, the level in the pressure-tube 24 will reach that of the liquid in the tank, and if, with the valves 16, 17, and 20 open, the pressure in the distributing-chamber is sufficient to force the liquid through the absorbent liquid-conveying pad 9<sup>a</sup> more rapidly than is required at the printing-surface the valve 17 may be closed, whereby the pressure upon the contents of the distributing-chamber is due solely to the column of liquid in the pressure-tube 24 and the connected parts, including the tube 25 and the outlet-tube 19; also, if this pressure is too great a less height of column in the pressure-tube may be provided. In other words, by the use of a pressure-tube 24 or the equivalent thereof the pressure upon the contents of the distributing-chamber may be regulated to produce the desired rapidity of flow or supply at the printing-surface, whereby the greatest efficiency in operation may be attained.

In Fig. 5 I have shown a slightly-modified construction of liquid-feeding device in connection with the pad-holder, wherein the flexible tubing and transparent inspection or gage tube are omitted, the tank 21 being connected with the liquid-receiving chamber of the holder by means of a rigid tube 22, provided with a regulating-valve 23.

It will be understood, furthermore, that various other changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. A copying apparatus comprising a pad-holder, an absorbent copying-pad seated therein so as to leave an underlying distributing-chamber, an absorbent conveying-pad interposed between the copying-pad and said chamber, and means connecting said chamber with a liquid-supply, whereby the conveying-pad and copying-pad are constantly maintained in a moist condition, substantially as specified.

2. A copying apparatus having a holder, supporting-bars spanning the holder above the plane of its floor or bottom, an absorbent copying-pad supported by said bars, and means for supplying the space below the supporting-bars with a pad-moistening liquid, substantially as specified.

3. A copying apparatus having a copying-pad, a holder in which said pad is located, and having beneath the pad a chamber for the

reception of a pad-moistening liquid, means for supplying liquid to said chamber, and an air-outlet conveyer in communication with said chamber, substantially as specified.

4. A copying apparatus having a copying-pad, a holder in which said pad is located, and having beneath the pad a chamber for the reception of a pad-moistening liquid, means for supplying liquid to said chamber, and an air-outlet conveyer in communication with said chamber, and provided with a controlling-valve, substantially as specified.

5. A copying apparatus having a holder, channeled supporting-bars spanning the holders in a common horizontal plane, a bracing-web spanning the holder beneath and transversely to said supporting-bars, an absorbent pad supported by said bars, and means for communicating a continuous supply of pad-moistening liquid to the interior of the holder beneath the plane of the pad, substantially as specified.

6. A copying apparatus having a copying-pad, a holder in which the pad is located, and means for communicating a supply of pad-moistening liquid to the interior of the holder beneath said pad, said means including a valved conveyer in communication with a tank, and said conveyer having flexible sections and an interposed transparent gage-tube, substantially as specified.

7. A copying apparatus having a holder provided with fixed lower wall-sections, bounding a liquid-receptacle, and movable upper wall-sections adjustable vertically with relation to the lower wall-sections, a copying-pad supported in the holder, and adapted to be absorbently fed with liquid from said receptacle, and means for adjusting the upper wall-sections with relation to the lower wall-sections, substantially as specified.

8. A copying apparatus having a holder provided with fixed lower wall-sections, bounding a liquid-receptacle, and movable upper wall-sections adjustable vertically with relation to the lower wall-sections, a copying-pad supported in the holder in a fixed position with relation to the lower wall-sections, and adapted to be absorbently fed by liquid in said receptacle, and means for adjusting the upper wall-sections with relation to the lower wall-sections, substantially as specified.

9. A copying apparatus having a copying-pad, a holder in which said pad is located, said holder having beneath the pad a distributing-chamber, valved means for supplying a pad-moistening liquid to the chamber, and a pressure-tube also in communication with said chamber, substantially as specified.

10. A copying apparatus having a copying-pad, a holder in which said pad is located, said holder having beneath the pad a distributing-chamber, valved means for supply-

ing a pad-moistening liquid to the chamber, and a transparent pressure-tube also in communication with said chamber, substantially as specified.

- 5 11. A copying apparatus having a copying-pad, a holder in which said pad is located, said holder having beneath the pad a distributing-chamber, valved means for supplying a pad-moistening liquid to the chamber,  
10 and a valved pressure-tube also in commu-

nication with said chamber; substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANK HENRY WOLEVER.

Witnesses:

HORACE R. PETERS,  
W. S. VANCE.