

*G. F. Lewis & F. D. Stuart.*  
*Cylindrical Plate Printing Mach.*  
*Nº 77896. Patented May 12. 1868.*

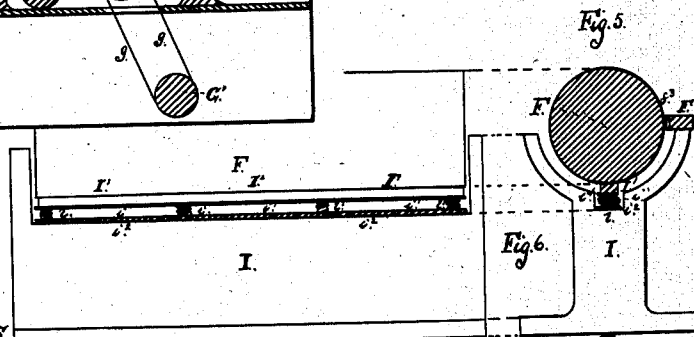
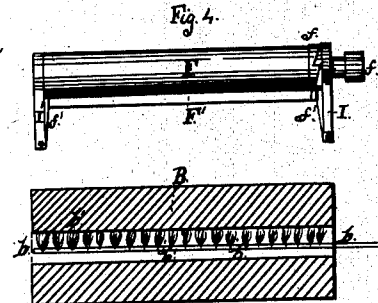
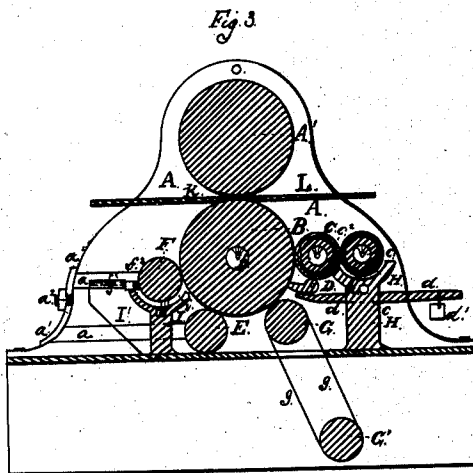
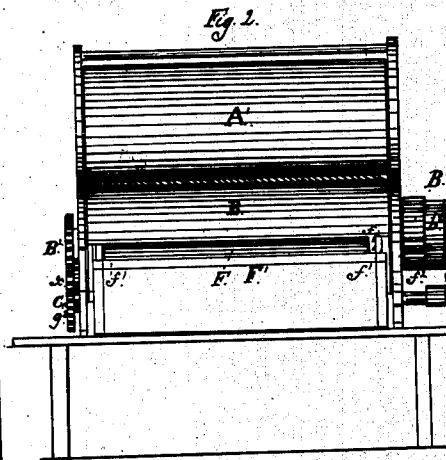
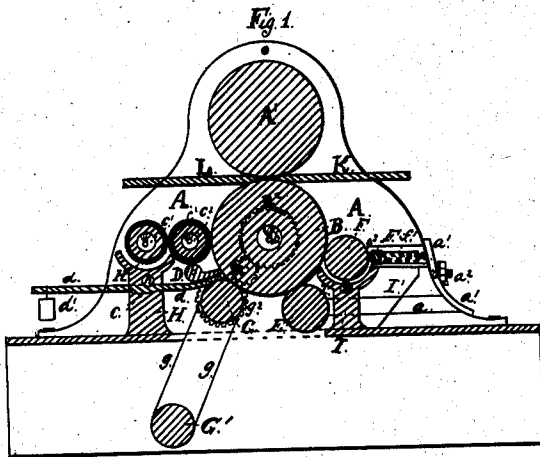


Fig. 6.

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# United States Patent Office.

GEORGE F. LEWIS, OF PHILADELPHIA, PENNSYLVANIA, AND FREDERICK D. STUART, OF WASHINGTON CITY, DISTRICT OF COLUMBIA.

*Letters Patent No. 77,896, dated May 12, 1868.*

## IMPROVEMENT IN CYLINDRICAL PLATE-PRINTING MACHINERY.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, GEORGE F. LEWIS, of Philadelphia, county of Philadelphia, and State of Pennsylvania, and FREDERICK D. STUART, of Washington city, and District of Columbia, have invented certain new and useful Improvements in Printing-Cylinders for Plate-Printing; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, and to the letters of reference marked thereon, making part of this specification, in which-

Figure 1 is a transverse section looking from one end

Figure 2 is a side elevation.

Figure 3 is a transverse section looking from the other end.

Figure 4 is an enlarged plan view of detergent-roller and buffing-apparatus.

Figure 5 is an enlarged section of the printing-cylinder, showing the gas-burners.

Figure 6, enlarged sections of the detergent-roller trough and detergent-boards and springs.

The nature of our invention consists in the use of engraved cylinders for "plate"-engraving, instead of the usual flat plates.

It has been customary to engrave, upon a softened steel plate, devices, pictures, or designs, and then harden the plates, and transfer the engraving to a soft-steel cylinder, which, in turn, is hardened, and becomes the matrix from which all future plates can be renewed.

This class of printing from cylinders has not been hitherto successful, in consequence of the difficulties connected with the inking and cleansing of the surfaces not engraved. In calico-printing, where the figures are not expected to be well defined, or to possess that sharpness of outline which must be in paper engravings, the cleansing is effected to some extent, but not sufficiently to answer for fine engraved lines.

In our machine, we accomplish this in such a successful manner as to insure the same finish and effect as in plate-printing, which is now done mostly by hand. The slowness of the process in ordinary plate-printing has kept back the progress of that art far behind all other methods of printing, and hence the prime necessity of introducing a process whereby the onward movement of the cylinder-printing, which has been so successfully employed in all other branches of the printing-art, should be applied to the most finished and beautiful of them all. By our machine, we can print all manner of engravings, however large or small, as rapidly as newspapers are thrown out from any cylinder letter-press. In the small designs, such as postage-stamps, labels, circulars, bank-notes, checks, bills, &c., by repeating the design upon the periphery of the cylinder as often as the circumference will admit, and side by side to the lineal extent of its axial dimensions, and with paper in rolls, if necessary, thousands upon thousands may be multiplied by the minute, so that plate-engraving will become as common as the daily newspaper, the handbill, or circular.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A is the frame, of iron; A<sup>1</sup>, the pressing-roller; B, the printing engraved cylinder; B<sup>1</sup>, the pulley on the end of its shaft; B<sup>2</sup>, the spur-wheel on the other end of front-cylinder shaft; C, the ink-roller; C<sup>1</sup>, the distributing-roller; D, the doctor or scraper; E, the second wiping-roller; F, the detergent-roller; G and G<sup>1</sup>, rollers with endless cloth, *g* and *g*; H, the ink-trough and stand; I, the detergent-trough and stand; K, the feed-board; L, the delivering-board; *a*, the slides, fitted into the frame A to permit the removal of the detergent-apparatus; *a*<sup>1</sup>, the clamp holding the two slides *a a* firmly together; *a*<sup>2</sup>, the screw and nut by which the clamp and slides are held to the frame; *b*, the gas-tube in the centre of the printing-cylinder B, for gas-burners; *b*<sup>1</sup>, a second pulley on shaft of B, to drive the pulley of G; *c*, the fulcrum of lever *d* in stand H; *c*<sup>1</sup> and *c*<sup>2</sup>, the gas-tubes in the ink-rollers C and C<sup>1</sup>; *g*<sup>2</sup>, the pinion on G, taking motion from the intermediate wheel *x*, actuated by the main spur-wheel, B<sup>2</sup>, on cylinder B; *f*<sup>1</sup> *f*<sup>2</sup>, springs on the detergent-rubber F<sup>1</sup>, and one of which, acted

upon by the rack  $f$  on the end of roller  $F$ , causes it to have a rubbing lateral motion to and fro;  $f^2$  the pulley, and  $f^3$  the buff on the edge of  $F^1$ ;  $g$   $g$ , the endless cloth running around  $G$   $G^1$ ;  $h$ , the tube in ink-trough stand for gas-burners;  $i$ , the spring under roller  $F$ ;  $i^1$ , the board supporting the detergent-compound  $I^1$ ;  $i^2$ , the lower board. Between these boards are four or more springs,  $i$ , along the length of the trough, to hold up the detergent to the roller.

In the application of cylinders for printing engravings, it becomes necessary to heat the cylinder, which has heretofore been done by steam or hot air, or heated irons placed under the plates; but we have found that in the use of steam or hot air for the purpose of heating the printing-cylinder and the ink-trough heretofore used, there can be no ready means of regulating the temperature at these parts of the machine, as when steam from the boiler or hot air from the furnace is used, it must be at the temperature of steam or the furnace; but by our use of gas, under the control of valves at the machine itself, the operator has entire control, and can regulate the temperature by the gauge of the burners, according to the thermometer, or it may be arranged automatically, to any degree of temperature required, by any usual device of extension-bars, operating upon a lever-handle to the gas-valve immediately at the press. We therefore make the printing-cylinder hollow, for the introduction of a gas-tube with a series of burners; and for economy, the main part of the cylinder may be of cast iron, and an annulus of steel or copper, or any other suitable material, may be fitted thereon, or the cylinder may be all of steel. We do not limit our invention in this particular. The hollow space, however, should always be in proportion to the diameter of the cylinder, so that the heating may be done to suit the circumstances of each cylinder. In connection with the heating of the cylinder, we introduce, similarly, jets of gas in a tube beneath the ink-trough, so that the ink, being properly warmed, is transmitted to the engraved cylinder; and, that its temperature may not be reduced, we make the inking-rollers, both ductors and distributing-rollers, hollow, and provide gas-burners within them, as many as may be found requisite to keep up the proper degree of heat. These inking-rollers are to be made of hollow metal cylinders, covered with suitable materials for inking-surfaces, and which will resist the action of a moderate degree of heat.

In connection with the heating of the ink and printing-cylinders, we introduce, by a series of cog-wheels, as represented, commencing on the end of the shaft of the printing-cylinder, with a spur-wheel, which transmits its motion, by an intermediate pinion, to another wheel on the end of the shaft, carrying the endless-cloth wiper, the direction of which wiper is reversed from that of the printing-cylinder, and running at a more rapid rate, we have a more successful method of cleaning the unengraved surface than is usually applied. Preceding the cloth wiper is a doctor. Following the wiper is another roller, covered with any suitable material, of rubber cloth or other elastic surface, which aids in further removing the surface-ink, and the cylinder is ready for the detergent substance, which impinges below the detergent-roller, and is kept up to it by springs, the detergent being in a solid form, and continuous along the roller. This roller is then rubbed by the buffing-surface, which may be of buckskin, chamois leather, or other equivalent material.

We believe that in this machine for cylinder-engraved printing we have combined all the essential features necessary to produce as fine and beautiful prints as can be produced by the flat plate, and in so rapid a manner as to reduce this class of printing to the same economic standard as letter-press, stereotype, lithograph, or any other of the branches of the printing-art.

Having thus fully described our invention, what we claim therein as new, and desire to secure by Letters Patent, is—

1. Applying whitening or other material, as a detergent, to the cylinder, in a solid form, by means of boards  $i^1$   $i^2$  and springs  $i$ , or equivalents, substantially as described.

2. The buff  $f^3$  applied to the detergent-roller  $F$ , substantially as and for the purpose described.

3. The application of gas to heat the printing-cylinder and the ink-rollers, by means of pipes  $b$  passing through said rollers, and provided with burners or jets  $b^1$   $b^2$ , substantially as described.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

GEO. F. LEWIS,  
FRED. D. STUART.

Witnesses:

JOHN D. BLOOR,  
EDWIN JAMES.