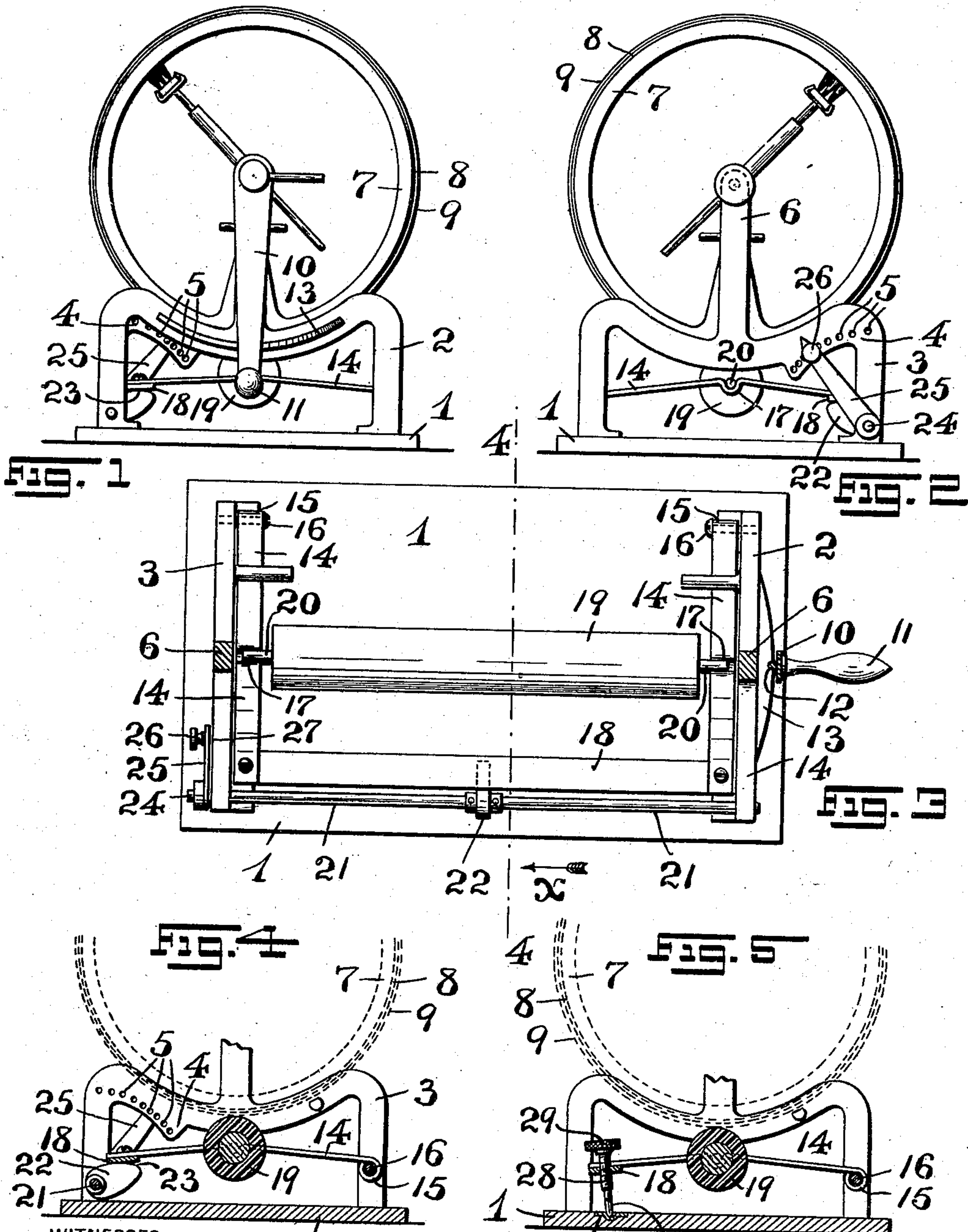


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PATENTED OCT. 8, 1907.

W. G. FUERTH.
STENCILING MACHINE.

APPLICATION FILED DEC. 23, 1905. RENEWED JULY 3, 1907.



WITNESSES:

Geo. D. Richards
Harry G. Patton

INVENTOR:

William G. Fuertth
BY *Fred C. Fraentzel*
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM G. FUERTH, OF NEWARK, NEW JERSEY, ASSIGNOR TO EQUILIBRATOR COMPANY,
A CORPORATION OF NEW JERSEY.

STENCILING-MACHINE.

No. 867,577.

Specification of Letters Patent.

Patented Oct. 8, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM G. FUERTH, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Stenciling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention has reference to improvements in that class of apparatus for the purpose of printing or reproducing fac-simile duplications of autographic, as well as typewritten matter, from paper stencils known in the art and ordinarily designated as the mimeographing process, which consists of removing portions of the coating of waxed sheets of paper by the impact of a type-face, as in writing thereon with a type-writing machine; or, by traversing the waxed surface with the point of a stylus.

My present invention relates, more particularly, to the production of a novel and simple equilibrating pressure-device; and, the invention has for its principal object to provide a device of this character which can be readily manipulated, so that the pressure-roll and rigid stencil-bearing surface are evenly under pressure at every point in the surfaces under contact, and thereby securing a perfect re-print of the writing or other like matter throughout the face of the sheet; and, furthermore, securing the delivery of the impression sheet without wrinkling or creases, which is one of the serious defects with the devices known as the rotary type or duplicators, or stencil printing apparatus and as now found in the art, and which is entirely removed with my novel form of equilibrating means.

A further object of this invention is to provide an arrangement of presser roll having great resiliency, which permits the ingress of the paper fed into the apparatus to slip past the actual point contact and penetrate up to the critical or extreme point of pressure between the presser roll and main cylinder or drum, where it is arrested and firmly held until the rotary movement is begun, and whereby a paper stop and stripper are obviated in its feeding operation into the apparatus, and for the purpose of stripping the paper finally from the main drum or roll.

Devices of this especial type, at present, operate upon the capillary attraction principle, and any defective space or contact between the parts defeats the function desired, by causing an uneven and broken continuity in the flow of the ink-supply, which is not under proper control.

In the present state of the art, the pressure-roll is actuated in and out of contact by means of set-screws or torsion springs, mounted at either end or bearings of the roll and are manipulated by thumb-screws or other similar devices, which offer no guide nor certitude or assurance in securing an equilibrium or balance and consequent uniformity of pressure throughout the surface of contact. It is for this reason, that the impression sheet is held more firmly along one of its edges than at the other, whereby the sheet is fed faster at the firmer side, while the lighter pressure is sufficient to prevent its egress, and thereby causes the sheet to creep together and become pressed into unshapely creases throughout the central portion of the impression sheet as it is delivered; furthermore, capillary attraction is broken, whereby the ink-mat which encircles the stencil bearing-cylinder is shifted and wrinkled and drawn away from the flow of ink, this impeding the operation and defeating the possibility of obtaining uniformly printed and commercially valuable copies.

To overcome these serious objections now existing is the main purpose of this invention, and with this in view, I have taken into consideration that the absolute control of the flow of the ink, by the capillary attraction principle is established with absolute certainty, by means of equilibrating and graduating the pressure, in ratio with the caliber of the orifices or ink-pores contained in the sheathing that forms the rigid periphery or bearing-surface of the stencil-holding cylinder, and a proper density or storage-capacity of the fabric serving the ink to the stencil, and adapting a certain viscosity to the ink-fluid, so that all the essentials co-act. For instance, an ink-fluid of low specific gravity will require penetrable cavities of greater density than a more dense or viscid compound, all of which is well understood by those skilled in the art to which this invention appertains.

My present invention consists therefore in the novel equilibrating device and its means of adjustment hereinafter more fully set forth; and, furthermore, this invention consists in the various novel arrangements and combinations of devices and parts, as well as in the details of the construction of the same, all of which will be fully described in the accompanying specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:

Figures 1 and 2 are the two end views of a rotary duplicator or stencil printing apparatus, provided with an equilibrating pressure device embodying the principles of the present invention; and Fig. 3 is a horizontal sectional representation of the frame-work of

the duplicator or stencil-printing apparatus, and a plan view of the pressure-roll and equilibrating pressure device upon which said pressure-roll is mounted. Fig. 4 is a transverse sectional representation of the parts shown in said Fig. 3, said section being taken on line 4—4 in said Fig. 3, looking in the direction of the arrow X; and Fig. 5 is a similar view, showing the equilibrating pressure device provided with a pressure-adjusting means of a slightly modified form of construction.

Similar characters of reference are employed in all of the said above described views, to indicate corresponding parts.

Referring now to the said drawings, the reference-character 1 indicates any suitable base, upon which are arranged and suitably secured, a pair of suitably shaped supports or standards 2 and 3, one of which, as 3, is provided with a segmental portion 4 which is formed with a series of closely located perforations or holes 5, substantially as shown and for the purposes presently more fully described.

Each support or standard is provided with an upright 6 formed at their upper ends with suitable bearing-portions in which is rotatably mounted in the usual manner, a stencil-carrying drum or cylinder 7. Suitably arranged upon said drum or cylinder 7 is the usual inked cloth or mat 8, and 9 indicates the stencil-sheet. The parts of the said cylinder 7 are of the usual and well-known construction, and 10 indicates the usual lever provided with a handle 11 for producing the rotary motion of said cylinder 7, said lever or crank 10 being provided with a projection 12 adapted to register with a notched rib or extension 13 upon the support or standard 2, forming the subject-matter of another application for Letters-Patent, filed by me January 5th, 1906, Serial No. 294,696, and the object of which is fully described in said application. It will be understood, however, that any other form of lever or crank and handle for rotating said cylinder 7 may be employed, if desired.

Coming now to the equilibrating pressure device, the same consists essentially of a pair of springs or spring-bands 14, each spring or band being provided with a loop or eye 15 which are arranged upon laterally extending lugs, pins or screws 16 upon the inner faces and rear portions of the respective supports or standards 2 and 3, substantially as illustrated in Figs. 3, 4 and 5 of the drawings. The said springs or spring-bands 14 are preferably upwardly bent or curved, as shown, each spring or band 14 being provided with a bearing-portion 17, substantially of the form and construction shown, and in alinement with the vertical plane of the central axis of the cylinder 7. At their forward ends, the said springs or spring-bands 14 are secured to or connected with a lateral extending bar or plate 18, and rotatively mounted in said bearings 17 are the journals 20 of a presser or printing roll 19. Rotatably arranged in suitably disposed bearings in the forward parts of the said supports or standards 2 and 3 is a rod or shaft 21, upon the central portion of which is secured a rearwardly extending lifting or raising member 22, the marginal edge of which is preferably curved, as at 23, and extends beneath and is movably disposed beneath the central portion of the previously mentioned bar or plate 18, as shown. One end 24 of said

shaft or rod 21 extends beyond the outer face of the support or standard 2, and has secured thereon a lever or crank 25, of a suitable spring-metal, and is provided with a handle or finger-piece 26. The said lever or crank 25 is provided with a suitable projection or pin 27, which, on account of the resilient action of the said lever or crank 25, can be easily moved into and out of engagement with any one of the previously mentioned perforations or holes 5, as will be clearly understood. Thus, by the proper manipulation of said lever or crank 25, the rod or shaft 21 is actuated, and its lifting or raising member 22 made to lift or lower the laterally extending bar or plate 18 of the equilibrating device, the parts being maintained in their adjusted positions by the entrance of the projection or pin 27 into the intended hole or perforation 5, according to the degree of pressure with which it is intended to force the presser roll against the main cylinder 7 and the parts thereon.

In Fig. 5 of the drawings, I have shown a slightly modified arrangement for raising or lifting the pressure equilibrating device. In this construction, the laterally extending bar or plate 18 is provided with a centrally disposed screw-threaded hole in which is screwed a set-screw 28 provided with a finger-piece 29, and having its lower end-portion 30 resting upon a suitably formed plate 31 in the base 1. By properly turning the said set-screw 28, the said bar or plate 18 can be suitably adjusted, with the results hereinabove set forth, and for the proper equalization of the pressure of the presser-roll 19 against the cylinder 7 and the parts thereon.

From the foregoing description of my present invention, it will be clearly seen, that the presser-roller-supporting springs or spring-bands have a free oscillation, and are not cramped under tension, thereby securing the proper alinement of the pressure-roll at all times when contacting with the stencil. At the same time, the lifting or raising device 22, or the impaling screw 28, or other equivalent device, is capable of sustaining the bar or plate 18 and other parts, under pressure, and which is capable of proper adjustment. By this means perfect equilibrium in the application of the pressure is secured, in case of uneven temper or heft of the metal of the springs or spring-bands upon which the pressure-roll is mounted; or, if there be greater tension on either of the ends, the very means of such uneven or excess of pressure will compel and establish an equilibrium.

The phenomena of capillary attraction, which is the essential principle for the successful operation of this type of duplicating apparatus, and its employment within any degree of certitude or possibility of control, rests absolutely upon the co-action of the inductive and reductive factors, and for this especial purpose, my invention, as previously described, establishes both certitude and harmony that renders all the factors under positive control.

I claim:—

1. A printing-apparatus or stenciling machine comprising a pair of standards, a main cylinder adapted to carry a stencil mounted between said standards, points of pivotal support extending inwardly from and at the back of each support, spring-bands of great resilience connected at their rear ends with said points of pivotal support, said spring-bands being capable of oscillatory motion in vertical planes, at right angles to the central longitudinal axis of

said cylinder, a laterally extending band at or near the front end-portions of the standards, said laterally extending band having an oscillatory action in a vertical plane substantially parallel to the vertical plane passing through the central longitudinal axis of said cylinder, and the oscillatory action of said laterally extending band cooperating with the resilient action of the rearwardly extending spring-bands, means for securing the free and unsupported ends of the laterally extending band to the free and unsupported ends of the rearwardly extending spring-bands, a pressure-roller having its journals supported on said spring-bands intermediate of the points of oscillatory support of said spring-bands and their free and unsupported ends, and in vertical alinement with the vertical plane passing through the central longitudinal axis of said main cylinder, and a support centrally disposed beneath said laterally extending band, all arranged to produce a pressure upwardly of the pressure-roller against the main cylinder, but permitting of a rocking motion of the laterally extending band on opposite sides of its central support and simultaneously therewith of an oscillatory motion of the rearwardly extending spring-bands, for equalizing the pressure of the pressure-roller against the main cylinder, substantially as and for the purposes set forth.

2. A printing-apparatus or stenciling machine comprising a pair of standards, a main cylinder adapted to carry a stencil mounted between said standards, points of pivotal support extending inwardly from and at the back of said support, spring-bands of great resilience connected at their rear ends with said points of pivotal support, said spring-bands being capable of oscillatory motion in vertical planes, at right angles to the central longitudinal axis of said cylinder, a laterally extending band at or near the front end-portions of the standards, said laterally extending band having an oscillatory action in a vertical plane substantially parallel to the vertical plane passing through the central longitudinal axis of said cylinder, and the oscillatory action of said laterally extending band cooperating with the resilient action of the rearwardly extending spring-bands, means for securing the free and unsupported ends of the laterally extending band to the free and unsupported ends of the rearwardly extending spring-bands, a pressure-roller having its journals supported on said spring-bands intermediate of the points of oscillatory support of said spring-bands and their free and unsupported ends and in vertical alinement with the vertical plane passing through the central longitudinal axis of said main cylinder, and a cam-shaped lifting or raising support centrally disposed beneath said laterally extending band, all arranged to produce a pressure upwardly of the pressure-roller against the main cylinder, but permitting of a rocking motion of the laterally extending band on opposite sides of its central support and simultaneously therewith of an oscillatory motion of the rearwardly extending spring-bands, for equalizing the pressure of the pressure-roller against the main cylinder, substantially as and for the purposes set forth.

3. A printing-apparatus or stenciling machine comprising a pair of standards, a main cylinder adapted to carry a stencil mounted between said standards, points of pivotal support extending inwardly from and at the back of each support, spring-bands of great resilience connected at their rear ends with said points of pivotal support, said spring-bands being capable of oscillatory motion in vertical planes, at right angles to the central longitudinal axis of said cylinder, a laterally extending band at or near the front end-portions of the standards, said laterally extending band having an oscillatory action in a vertical plane substantially parallel to the vertical plane passing through the central longitudinal axis of said cylinder, and the oscillatory action of said laterally extending band cooperating with the resilient action of the rearwardly extending spring-bands, means for securing the free and unsupported ends of the laterally extending band to the free and unsupported ends of the rearwardly extending spring-bands, a pressure-roller having its journals supported on said spring-bands intermediate of the points of oscillatory support of said spring-bands and their free and unsupported ends and in ver-

tical alinement with the vertical plane passing through the central longitudinal axis of said main cylinder, and a laterally extending shaft having its ends rotatably supported in bearings of said standards, a cam-shaped lifting or raising support centrally disposed upon said shaft, said support being in engagement with the lower surface of said laterally extending band at a point centrally between the ends of said band, and means connected with said shaft for producing an oscillatory motion of the shaft, all arranged to produce and regulate the pressure upwardly of the pressure-roller against the main cylinder, but permitting of a rocking motion of the laterally extending band on opposite sides of its central support and simultaneously therewith of an oscillatory motion of the rearwardly extending spring-bands, for equalizing the pressure of the pressure-roller against the main cylinder, substantially as and for the purposes set forth.

4. A stenciling machine comprising a pair of standards, a main cylinder adapted to carry a stencil mounted between said standards, a pair of rearwardly extending spring bands, each band being located adjacent to a standard and having a point of pivotal support at its rear end, so as to be capable of oscillatory motion in vertical planes, at right angles to the central longitudinal axis of said cylinder, a laterally extending band, said band having an oscillatory action in a vertical plane substantially parallel to the vertical plane passing through the central longitudinal axis of said cylinder, and the oscillatory action of said laterally extending band cooperating with the resilient action of said rearwardly extending bands and having its free and unsupported ends connected with the free and unsupported ends of the rearwardly extending bands, and a raising or lowering support centrally disposed beneath and in engagement with said laterally extending band for permitting of a rocking motion of said laterally extending band and simultaneously therewith of an oscillatory motion of the rearwardly extending bands, substantially as and for the purposes set forth.

5. A stenciling machine comprising a pair of standards, a main cylinder adapted to carry a stencil mounted between said standards, a pair of rearwardly extending spring bands, each band being located adjacent to a standard and having a point of pivotal support at its rear end, so as to be capable of oscillatory motion in vertical planes, at right angles to the central longitudinal axis of said cylinder, a laterally extending band, said band having an oscillatory action in a vertical plane substantially parallel to the vertical plane passing through the central longitudinal axis of said cylinder, and the oscillatory action of said laterally extending band cooperating with the resilient action of said rearwardly extending bands and having its free and unsupported ends connected with the free and unsupported ends of the rearwardly extending bands, and an adjustable raising or lowering support centrally disposed beneath and in engagement with said laterally extending band for permitting of a rocking motion of said laterally extending band and simultaneously therewith of an oscillatory motion of the rearwardly extending bands, substantially as and for the purposes set forth.

6. A stenciling machine comprising a pair of standards, a main cylinder adapted to carry a stencil mounted between said standards, a pair of rearwardly extending spring bands, each band being located adjacent to a standard and having a point of pivotal support at its rear end, so as to be capable of oscillatory motion in vertical planes, at right angles to the central longitudinal axis of said cylinder, a laterally extending band, said band having an oscillatory action in a vertical plane substantially parallel to the vertical plane passing through the central longitudinal axis of said cylinder, and the oscillatory action of said laterally extending band cooperating with the resilient action of said rearwardly extending bands and having its free and unsupported ends connected with the free and unsupported ends of the rearwardly extending bands, and an oscillatory and cam-shaped raising or lowering support centrally disposed beneath and in engagement with said laterally extending

band for permitting of a rocking motion of said laterally extending band and simultaneously therewith of an oscillatory motion of the rearwardly extending bands, substantially as and for the purposes set forth.

5 7. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination with a resilient roll to press the sheets against the stencil upon the cylinder, of a spring at each end of the roll to press it yieldingly against the cylinder, a bar for whose ends said springs serve as supports, and means for applying pressure to the bar at a point midway of its length to compensate for difference in their power and put them under equal tension and cause the pressure of the roll upon the cylinder to be the same at one end as at the other.

10 8. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination with a resilient roll to press the sheets against the stencil upon the cylinder, of springs at the ends of the roll to press it yieldingly against the cylinder, and means for tensioning said springs to press the roll against the cylinder, said tensioning means including a device whereby said springs are caused to act one against the other to bring them into equilibrium and cause the pressure of the roll upon the cylinder to be the same at one end as at the other.

20 9. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination with a resilient roll to press the sheets against the stencil upon the cylinder, of springs at the ends of the roll to press it yieldingly against the cylinder, and means for tensioning said springs to press the roll against the cylinder, said tensioning means including a device whereby said springs are caused to act one against the other to bring them into equilibrium and cause the pressure of the roll upon the cylinder to be the same at one end as at the other, and a device adjustable to regulate the degree to which said springs are tensioned by said tensioning means while preserving their equilibrium.

30 10. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination with a resilient roll to press the sheets against the stencil upon the cylinder, of a spring at each end of the roll to press it yieldingly against the cylinder, a bar for whose ends said springs serve as supports, a shaft, means for turning and detaining said shaft in various positions to which it is turned, and means upon said shaft to apply pressure to said bar at a single point midway of the length of the latter to tension said springs and cause one spring to act against the other to bring them into equilibrium and cause the pressure of the roll upon the cylinder to be the same at one end as at the other.

50 11. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination of a resilient roll to press the sheets against the stencil upon the cylinder, independently yieldable spring arms at the ends of the roll, supports upon the framework for said spring arms, a bar connecting said spring arms, and means for applying pressure to the bar at a point midway of its length to

compensate for the difference in the power of the spring arms and put them under equal tension and cause the pressure of the roll upon the cylinder to be the same at one end as at the other.

12. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination of a resilient roll to press the sheets against the stencil upon the cylinder, independently yieldable spring arms at the ends of the roll, supports upon the framework for said spring arms, a bar connecting said spring arms, and means for applying pressure to the bar at a point midway of its length to compensate for the difference in the power of the spring arms and put them under equal tension and cause the pressure of the roll upon the cylinder to be the same at one end as at the other, each of said arms being supported at one end upon the framework and at the other end connected to said bar, and said roll being journaled upon said arms between their ends.

13. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination of a resilient roll to press the sheets against the stencil upon the cylinder, independently yieldable spring arms at the ends of the roll, supports upon the framework for said spring arms, a bar connecting said spring arms, and means for applying pressure to the bar at a point midway of its length to compensate for the difference in the power of the spring arms and put them under equal tension and cause the pressure of the roll upon the cylinder to be the same at one end as at the other, said arms being loosely journaled upon the framework, and said roll being journaled directly upon said arms.

14. In a stenciling machine having a perforated inking cylinder to carry both an ink pad and a waxed paper stencil, the combination with a resilient roll to press the sheets against the stencil upon the cylinder, said roll releasable from the cylinder, of a single pressure device to press the roll against the cylinder, and a finger-piece having means to regulate the pressure of said pressure device; the roll being mounted so that either end may move away from the cylinder independently of the other, and said pressure device being connected to distribute its pressure evenly between the ends of the roll.

15. In a stenciling machine in which a waxed paper stencil and an ink pad are wrapped upon a perforated inking cylinder, the combination of a resilient roll to press the sheets against the stencil upon the cylinder, a pair of arms upon which said roll is journaled, said arms being journaled independently of each other upon the framework, a bar connecting said arms, and means for applying pressure to the bar at a point midway of its length; and means movable to relieve the pressure, and provided with a finger-piece.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 21st day of December, 1905.

WILLIAM G. FUERTH.

Witnesses:

FREDK. C. FRAENTZEL,
GEO. D. RICHARDS.