(No Model.) 2 Sheets—Sheet 1.

G. F. McADAMS.

LINE PRINTING MACHINE.

No. 553,356. Patented Jan. 21, 1896.

FIG. 1.

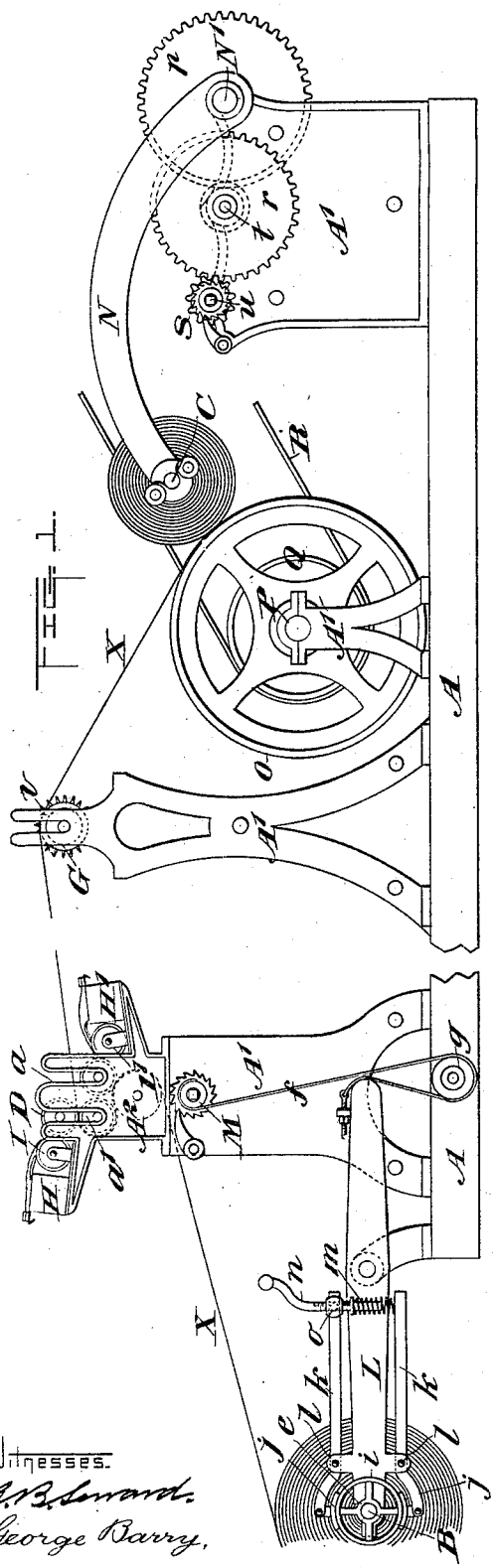
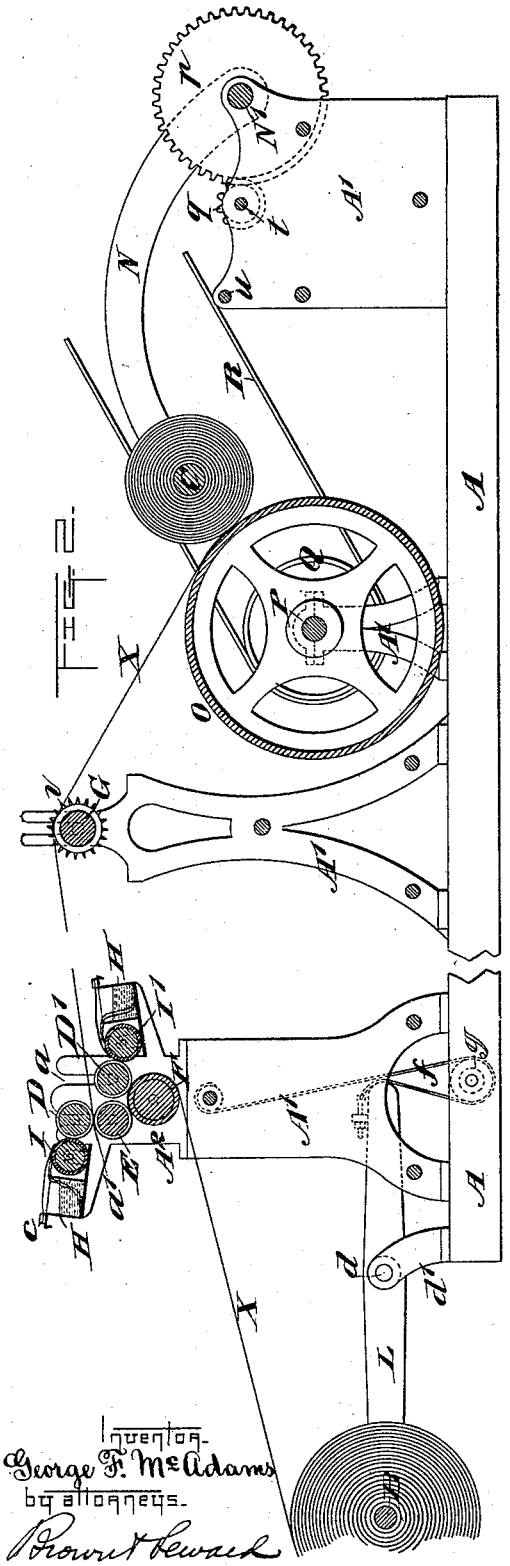


FIG. 2.



Witnesses.
R. B. Seward.
George Barry.

Inventor.
George F. McAdams
by attorneys.
Brown & Seward

(No Model.) 2 Sheets—Sheet 2.

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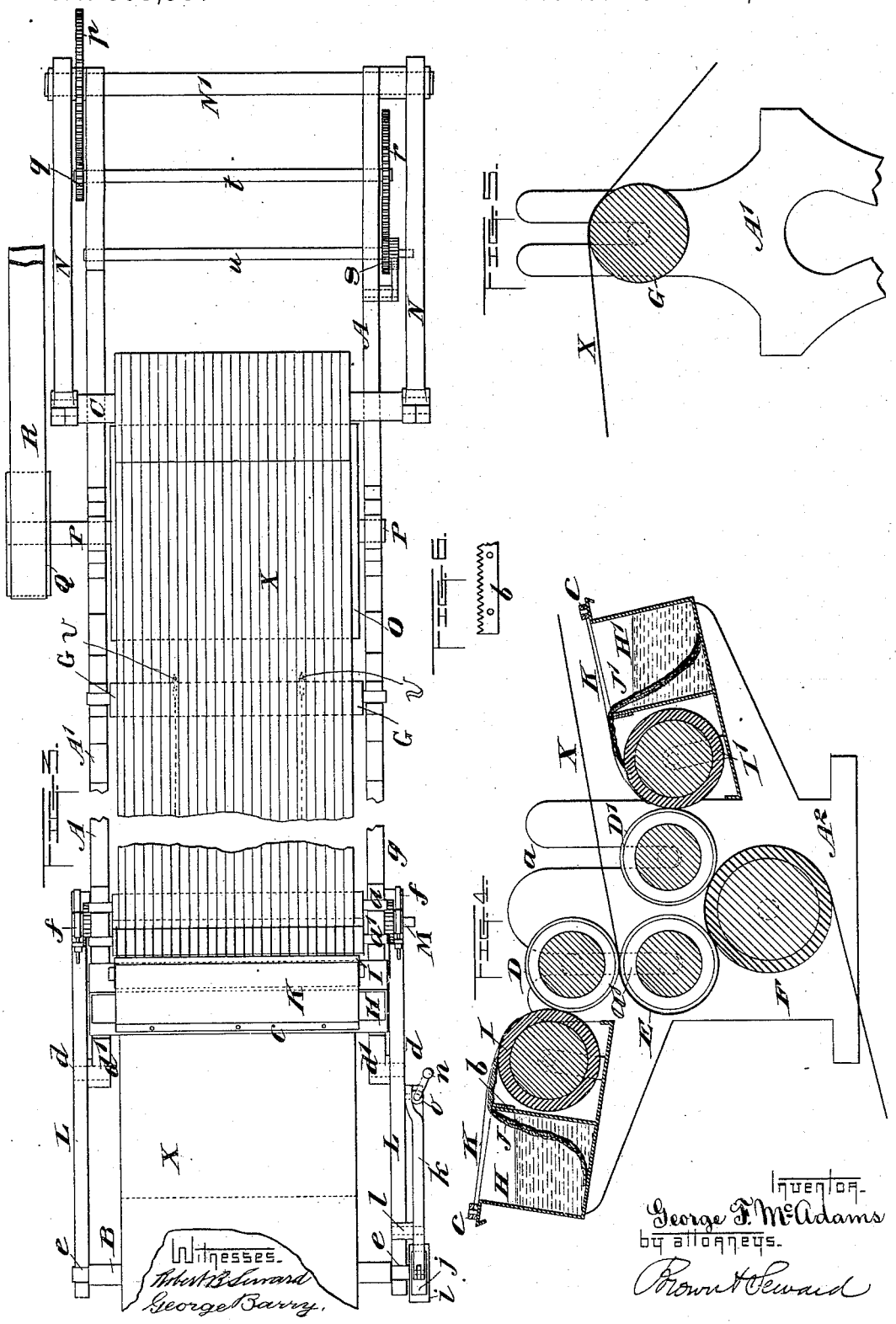

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Robert B. Seward
George Barry.

Inventor.
George F. McAdams
by attorneys.
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UNITED STATES PATENT OFFICE.

GEORGE F. McADAMS, OF BROOKLYN, NEW YORK.

LINE-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,356, dated January 21, 1896.

Application filed June 19, 1895. Serial No. 553,323. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. McADAMS, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Line-Printing Machines, of which the following is a specification.

I will describe in detail with reference to the accompanying drawings a machine for line-printing a continuous web of paper embodying my improvement and will afterward point out the novel features in claims.

Figure 1 represents a side elevation of the machine; Fig. 2, a longitudinal vertical sectional view of the same, and Fig. 3 a plan. Fig. 4 represents a vertical section corresponding with Fig. 2, but on a larger scale, of the printing-rollers, the impression-rollers, the inking-rollers, and the appurtenances of the latter. Figs. 5 and 6 are detail views which will be hereinafter explained.

Similar letters of reference designate corresponding parts in all the figures.

A A′ designate the framing of the machine, at one end of which is arranged the roller B, from which the web of paper X to be ruled or line-printed is supplied and near the other end of which is arranged the take-up roller C, on which the ruled or lined web is taken up. Between the supply-roller B and the take-up roller C are arranged printing-rollers D D′, for ruling or line-printing the two sides of the web, and two impression-rollers E F. The distance between the printing-rollers and the take-up roller C is such that the ink on the paper will be dry before the web reaches the take-up roller. For the purpose of preventing the sagging of the paper between the printing-rollers D D′ and keeping it well elevated for drying, a supporting-roller G is arranged in suitable bearings in the framing A A′.

To economize space in the drawings I have represented a portion of the bed-plate A as broken away and the portions of the machine on either side of the plate as brought much closer together than they would actually be.

The printing-rollers D D′ consist of what are known in line-printing machines as "disk rollers," the printing-surfaces being the edges of a series of properly-spaced disks. The impression-roller E, which co-operates with the printing-roller D, is a grooved metal roller, the grooves of which are opposite the disks of the said roller D, and the impression-roller F, which co-operates with the printing-roller D′, is a plain cylindrical roller faced with vulcanized india-rubber or other material, which gives it a soft or yielding peripherical surface. The said roller F is so faced to make it serve the additional purpose of assisting the web to drive the impression-roller E and the printing-rollers, as will be hereinafter more fully described.

The printing-rollers D D′ and the impression-rollers all have their bearings in standards A^2, erected upon the side framing A′, the said standards A^2 serving also to support the ink-fountains H H′ and the inking-rollers I I′. The soft-surfaced roller F runs in fixed bearings in the standards A^2. The journals of the roller D′ are fitted in slotted bearings *a* in the said standards, and the journals of the rollers E and D are fitted to slotted bearings *a′* in the said standards in order that they may be self-adjusting to each other and to the roller F by their own weight. The disk roller D and the grooved impression-roller E are both supported upon the soft-surfaced impression-roller F.

The inking-rollers I I′, which supply the ink to the printing-rollers D D′, receive the ink from the fountains H H′ through wicks J J′, each wick consisting of a strip of flannel, felt or other suitable absorbent material, the lower edge of which is immersed in the ink and the upper edge of which projects over one edge of the fountain and lies loosely on the top of its respective inking-roller. In order to prevent these wicks from being pulled out of the fountains by the friction of the inking-rollers upon them, the upper edge of the fountain is provided or furnished with a toothed blade *b*, the upper toothed edge of which projects slightly above the edge of the fountain, so that the wick will rest upon it. A face view of a portion of one of these blades is shown in Fig. 6. This blade might be formed by toothing the edge of the fountain itself.

For the purpose of spreading the ink on the inking-rollers each ink-fountain is furnished

with a spreader K, consisting of a strip of any suitable pliable fabric, preferably unabsorbent, such as sheet india-rubber, one edge of the said strip being secured to a fixed support—as, for instance, to that edge of its respective fountain farthest from the inking-roller by a clamping-strip *c*—and the other edge overlapping the wick and projecting beyond the wick over the inking-roller, so that it lies loosely over that portion of the said roller which has just received the ink from the wick. By this simple device the ink is spread most evenly.

The supply-roller B has its journals supported in bearings *e* provided at the outer ends of the two side bars L of a frame which is arranged as a lever upon a fulcrum *d* in standards *d'* upon the bed-plate A. The inner end of this frame has applied to it a hoisting apparatus consisting of a windlass M and cords *f* attached at one end to the windlass and passing under idler-pulleys *g* attached to the framing and connected at their other ends to the said frame L. This lever-like frame and hoisting apparatus form a convenient means of introducing a heavy roll of paper into the machine. To accomplish this it is only necessary to lower the outer end of the frame containing the bearings *e* to a suitable height and to roll the roll of paper along the floor to a position over the said bearings and then to apply power to the hoisting apparatus by hand or otherwise to raise the roll to a suitable height.

For the purpose of applying tension to the web X the supply-roller B is represented as furnished at one end with a brake-wheel *i*, to which friction is applied by brake-shoes *j* at the ends of two levers *k*, which are fulcrumed at *l* to the frame L, and to which pressure is applied by a spring *m* arranged between the said levers, the tension of said spring being controlled by a hand-screw *n* working through a swivel-nut *o* attached to one of the said levers.

The take-up roller C is supported in journal-boxes affixed to the side bars of a swinging frame N, which is secured to a shaft N' arranged in fixed bearings in the framing A A' of the machine close to the delivery end thereof, the said frame N being so arranged that the said roller with as much of the web of paper as is wound upon it may rest upon a driving-cylinder O, the shaft P of which is supported in bearings in the framing A A' at some distance from the delivery end of the machine and from the shaft N'. The shaft P is represented as furnished with a driving-pulley Q, through which it receives motion from a belt R. The take-up movement of the roller C and the web upon it is effected by the friction of the driving-cylinder O upon the rolled-up web on the take-up roller, the swinging frame N rising as the diameter of the rolled-up web increases without any disturbance of the roller in the journal-boxes of said frame.

To afford facility for the removal of the web from the machine after it has been ruled throughout its whole length, I provide for the swinging of the frame N upward and forward completely over its shaft N' to the other side thereof and beyond the framing A A' by a train of spur-gearing *p q r s*. This train consists of a spur-gear *p* on the shaft N', which meshes with a pinion *q* on the shaft *t*, the shaft *t* being further provided with a spur-gear *r*, which meshes with a pinion *s* on the shaft *u*, the said shafts *t* and *u* being arranged in bearings in the framing A A', the shaft *u* being capable of being turned by hand or by other means. By this gearing the frame N may be thrown over beyond the framing far enough to bring the rolled-up web, whatever its size, down onto the floor, where the take-up roller C and the web can be easily removed from the said frame by simply rolling them out after unfastening the journal-boxes of the roller.

In the operation of this machine the driving power is transmitted to the printing and impression rollers through the web X of paper, which is being ruled as the said web is drawn from the supply-roller by the action of the take-up, the power being all applied through the driving-cylinder O. The web passes from the supply-roller B first partly around the soft-faced impression-roller F and between the said roller F and the printing-roller D' and grooved metal impression-roller E, thence partly around the said impression-roller E and between the said impression-roller and the printing-roller D, thence on over the roller G to the take-up, being ruled on one side by the roller D' co-operating with the soft-faced roller F and on the other side by the roller D co-operating with the grooved roller E. In this operation the soft-faced roller F besides being an impression-roller and supporting the web against the printing operation of the roller D' performs another important function—viz., that of assisting the web to drive the other impression-roller and the two printing-rollers, the web hugging the soft surface of the said roller F with more friction than it could a metal roller, and therefore driving it with greater certainty, and the rollers E and D being driven more effectively by receiving the web between themselves and the said soft surface, which slightly yields to their pressure.

In the example of the invention represented in Figs. 1, 2 and 3 the supporting-roller G is provided with any number of circular series of pins or prickers *v* for the purpose of perforating the ruled web in any number of lines. The perforating operation is effected by the force with which the paper is caused to press upon the pins or prickers by the tension which is given to it by the friction-brake on the supply-roller while it is being drawn over the said roller G by the take-up roller, the rotation of the said roller G during this perforating operation being produced in part

by the action of the paper on the pins or prickers *v* and in part by the contact of the paper with the cylindrical surface of the roller G after the pins or prickers have penetrated to their full length. This operation is performed without the aid of any pressing device or support on the opposite side of the paper to that at which the pins or prickers enter and without any pressure on the paper but that due to its tension.

When it is not desired to perforate the paper, the roller G may be simply a plain roller, as shown in Fig. 5.

What I claim as my invention is—

1. The combination with two disk rollers for printing on opposite sides of a web, of a grooved impression roller opposed to and supporting one of said disk rollers, a soft faced impression roller separately and directly supporting both the other disk roller and the said grooved impression roller, and a take-up roller on its way to which the web passes between the said grooved impression roller and said soft faced roller and also passes between said other disk roller and said soft faced roller, substantially as herein set forth.

2. In a line printing machine, the combination with a disk roller and an ink roller for inking the same, an ink fountain, a wick for supplying ink from the fountain directly to said ink roller and an ink spreader consisting of a strip of pliable unabsorbent material one edge of which is attached to a fixed support and the other edge of which lies loosely over the said roller at a point beyond the contact of the wick with said roller, substantially as herein set forth.

3. In combination with means of simultaneously moving a web and subjecting it to tension, a perforating roller placed in the path of the web to operate by the movement of the latter and the pressure produced by the tension thereof, substantially as herein described.

GEORGE F. McADAMS.

Witnesses:
FREDK. HAYNES,
GEORGE BARRY.