2 Sheets—Sheet 1.

J. & W. A. McADAMS.
Paper-Ruling Machine.

No. 206,809. Patented Aug. 6, 1878.

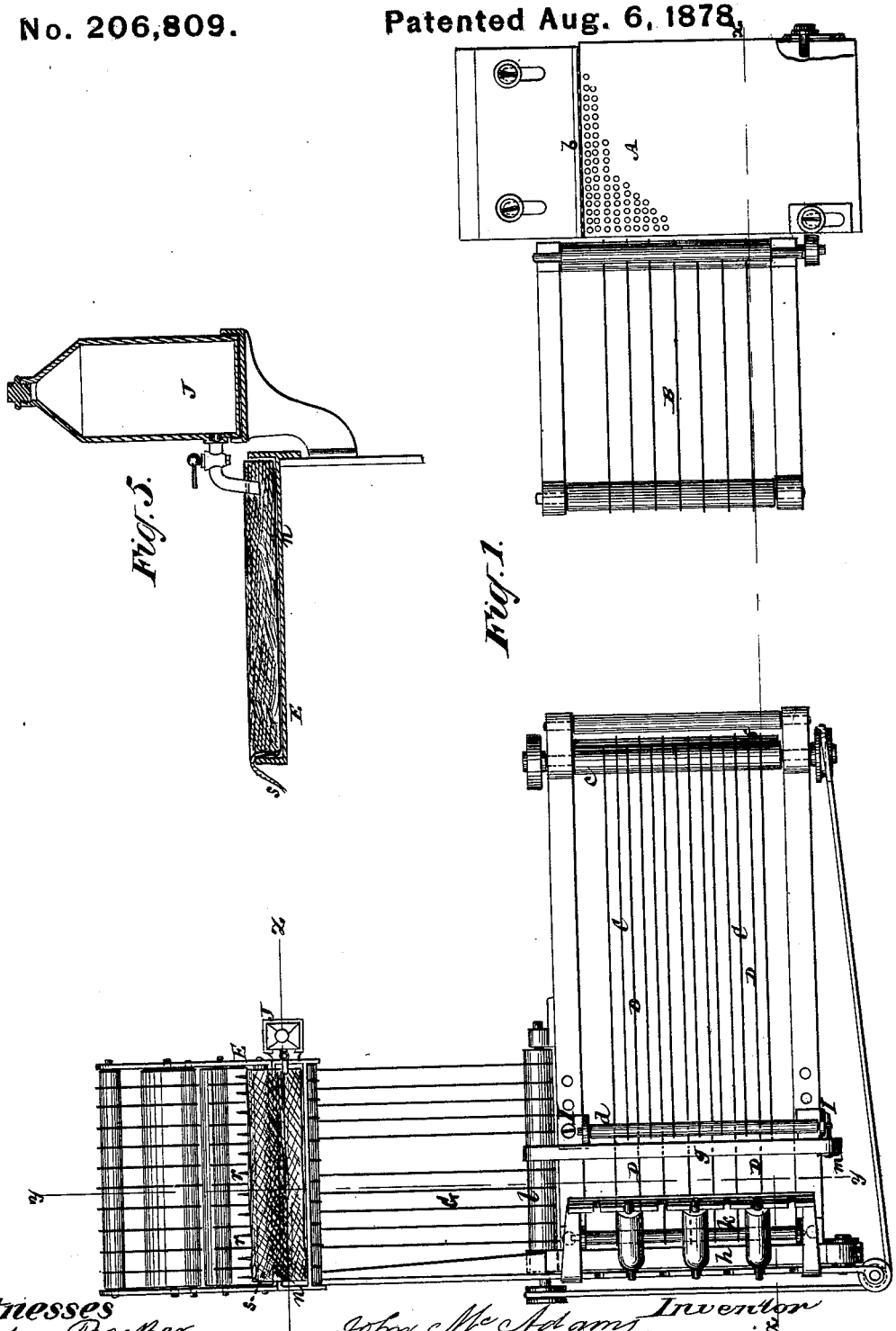

Fig. 1.

Fig. 3.

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2 Sheets—Sheet 2.

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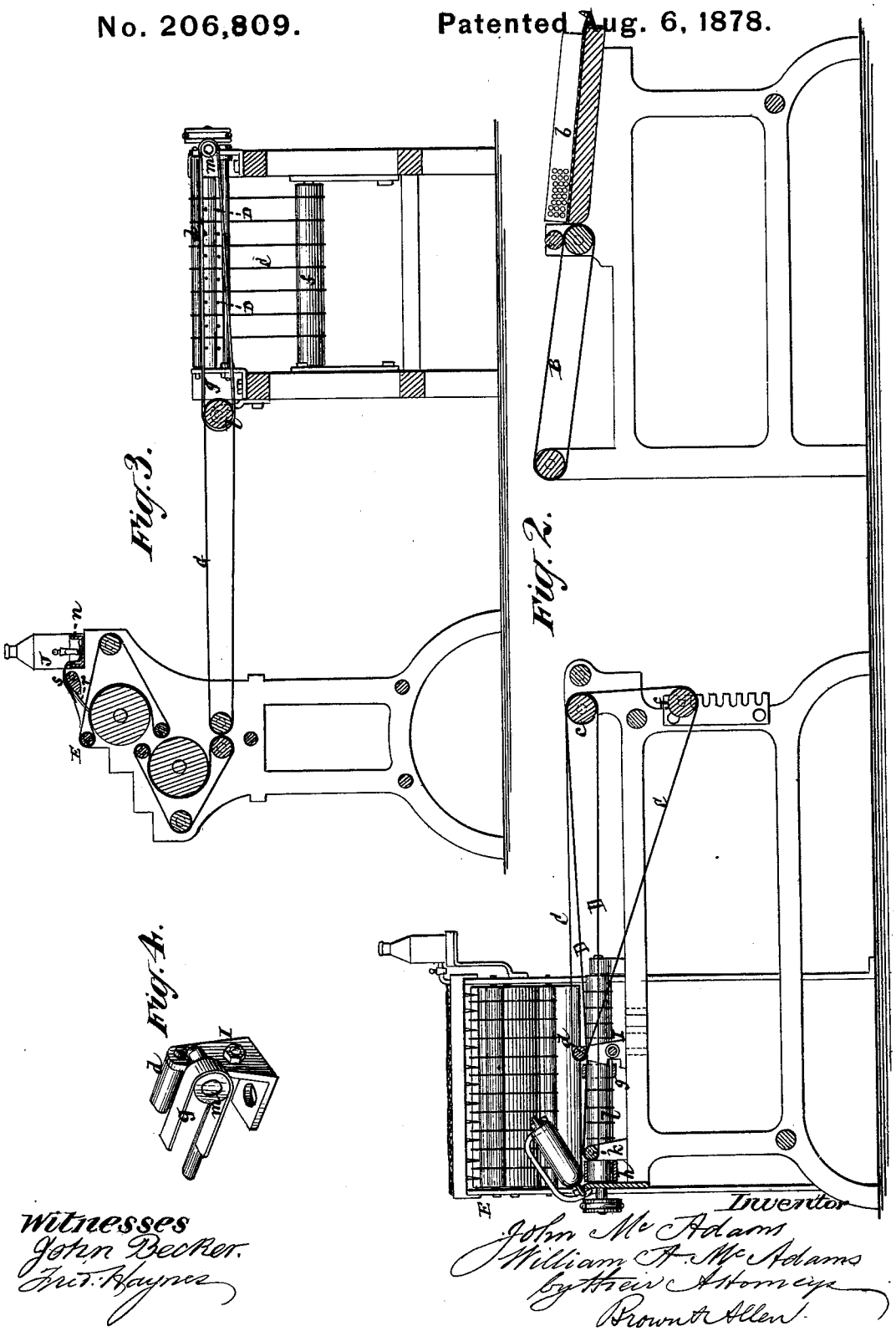

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UNITED STATES PATENT OFFICE.

JOHN McADAMS AND WILLIAM A. McADAMS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PAPER-RULING MACHINES.

Specification forming part of Letters Patent No. **206,809**, dated August 6, 1878; application filed November 22, 1877.

To all whom it may concern:

Be it known that we, JOHN McADAMS and WILLIAM A. McADAMS, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Paper-Ruling Machines, of which the following is a description, reference being had to the accompanying drawings, forming a part of this specification.

This invention more particularly relates to ruling-machines in which the paper, after it has been ruled by one set of pens with parallel lines running in one direction, is passed by one conveyer to another conveyer arranged to occupy a cross or right-angled position relatively to the first conveyer, and serving to conduct the paper to another set of pens arranged to rule the paper with parallel lines at right angles to the former ruling.

The invention consists in certain combinations of devices whereby, when the paper is being transferred from one set of ruling-pens to another, it is not only supported on both of its opposite margins, but provision is made for adjusting the transferring devices to suit different widths of paper.

The invention also consists in a feed board or table for sheets of paper laid thereon, composed of a solid or close base and a perforated or reticulated upper covering or top surface, constituting, in connection with the solid or close base, a series of air-cups, closed at their bottoms but open at their tops, whereby, while the perforated upper covering, when made of a separate piece or sheet, is restrained from springing, the perforations in it form air-cells, which prevent the formation of a vacuum beneath the paper, and thereby reduce resistance to the feed without having recourse to a forced current or blast through the perforations in the feeding-surface.

This last part of the invention is equally applicable to ruling-machines in which the ruling with parallel lines is in a single direction only.

In the accompanying drawings, Figure 1 represents a plan of a cross-ruling machine having our invention applied; Fig. 2, a longitudinal vertical section of the same on the line *x x*, and Fig. 3 a transverse vertical section thereof on the line *y y*. Fig. 4 is a perspective view of a detail, in part, connected with the sheet-transferring devices; and Fig. 5, a sectional elevation on the line *z z*, in illustration of the application of the fountain to the inking-trough from which the pens draw their supply.

A is the feeding board, table, or surface, along or over which the sheets to be ruled are fed one by one from a pile to the first conveyer, B, which conducts the sheets in succession to the first set of ruling-pens and inking apparatus connected with said pens, to rule the paper with parallel lines in one direction. From these pens and inking apparatus (neither of which are shown in the drawings) each sheet thus ruled in one direction passes to another endless conveyer, C, arranged to travel in the same direction as the conveyer B. Each sheet is fed over the table A by the hand of the operator as he stands at one side of said table, opposite an adjustable guide, *b*, which serves to direct one edge of the paper and give to the sheet its proper course and position. In thus manipulating the sheet over said feeding table or surface from one side of the latter, the hand of the operator naturally makes an upward sweep from the front toward the back of the table to pass the sheet to the conveyer B; and to facilitate this action and insure the proper pressure of the hand on the sheet till it passes to the conveyer, the feed board, table, or surface A is set inclining upward from its front to its back.

Furthermore, the feeding table or board is constructed with a perforated or reticulated upper surface, (see Fig. 4,) whereby the formation of a vacuum beneath the sheet being fed over the table is prevented, thus doing away with much resistance to the feed. This is effected without having recourse to a forced blast or current of air through the reticulated upper surface of said feed-board, and without destroying the solidity or closeness of the feed-board itself, by constructing said board or table of a solid or close base and perforated upper covering or top, which, when of a separate piece or sheet, is prevented from springing by the base, and in connection with the latter forms a series of air cups or cells, open at their tops but closed at their bottoms, and in which the air is confined by the sheets.

To change the direction of the motion for ruling at right angles, the conveyer C is constructed, and has combined with it transferring devices, substantially as follows: The conveyer C, which may be composed of endless strings, tapes, or one or more aprons, is arranged to run over or around a driving-roller, *e*, at its end nearest to the conveyer B, and over or around a free roller, *d*, at its opposite end, and from thence back to and around an adjustable lower roller, *f*, up to the driving-roller *e*. This conveyer C may be denominated the upper one of a pair of similarly-traveling conveyers, C D, the latter, D, of which (that may also be composed of strings, tapes, or one or more aprons) passes around the driving-roller *e*, under the roller *d*, through or between one, *g*, of a pair of parallel transverse belts, *g h*, to and around a roller, *k*, which is arranged at any desired distance from the roller *d*, beyond the conveyer C, and immediately in advance of the cross-belt *h*. The conveyer D, the upper traveling surface of which occupies a lower position to the upper traveling surface of the conveyer C, serves to conduct the sheet, after or while it is delivered by the conveyer C, till its two edges rest on the cross traveling belts *g h*, which change the direction in the motion of the sheet, for ruling it at right angles to the former ruling, by conveying it to a second set of pens and inking apparatus, E, or rather to a conveyer, G, leading thereto. One and the same roller, *l*, of this last-named conveyer drives both endless cross-belts *g h*.

To adapt the transverse belts *g h* to different-sized sheets or widths of paper, the belt *g* is made adjustable toward or from the belt *h*. To this end said belt *g*, which runs at its one end round the roller *l* of the conveyer G, and is capable of being slid along the same, is carried at its opposite end by a pulley, *m*, which is supported by an adjustable carriage, or one of a pair of combined adjustable standards, I. This carriage, which is adjustable in direction of the length of the conveyer C, not only carries the pulley *m* of the belt *g*, but also the roller *d*, round which the conveyer C passes, so that the roller *d* will always have the same close relation to the belt *g* under all adjustments of the latter. As, however, in adjusting the carriage I backward or forward, a lengthening or shortening of the conveyer C takes place, which it is necessary to provide for, the roller *f* is made adjustable up and down to let out or take up the strings, tapes, or belts of said conveyer, thus keeping the conveyer at a uniform stretch in all adjustments of the carriage I.

The inking apparatus has the ink maintained at a uniform level in its pan or trough *n* by the combination with said trough of a bird-fountain, J, which supplies the ink to the trough. By this combination the supply of ink to the ruling-pens *r* from the pan or trough *n*, by a cloth or other suitable conductor, *s*, is uniform, and the pens never become dry through neglect to keep up a supply of ink in the pan or trough, nor need the pens be raised from the paper when the machine stops.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of the transverse belt *g* and its pulley *m*, the roller *d* of the conveyer C, which conducts the sheet to said belt, and the adjustable carriage I, supporting said pulley and said roller, whereby provision is made for adjusting said belt and said roller without changing their relations, to adapt the machine to different widths of sheets, substantially as specified.

2. The combination, with the adjustable pulley *m* of the belt *g*, and the adjustable roller *d* of the conveyer C, of the adjustable roller *f* and the upper roller, *e*, whereby provision is made, by letting out or taking up the strings, tapes, or aprons of which the conveyer C is composed, to compensate for the adjustment of the pulley *m* and roller *d*, essentially as described.

3. The combination, with the upper conveyer, C, of the under conveyer, D, arranged to extend beyond the delivering end of the conveyer C, and the transverse belts *g h*, substantially as specified.

4. A feed board or table for feeding sheets of paper, composed of a solid or close base and a perforated or reticulated upper covering or top surface, having the perforations in it closed at their bottoms by said base, essentially as and for the purpose or purposes described.

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