(No Model.) 2 Sheets—Sheet 1.

B. KARFIOL.

DEVICE FOR RULING PAPER.

No. 561,996. Patented June 16, 1896.

Fig. 1.

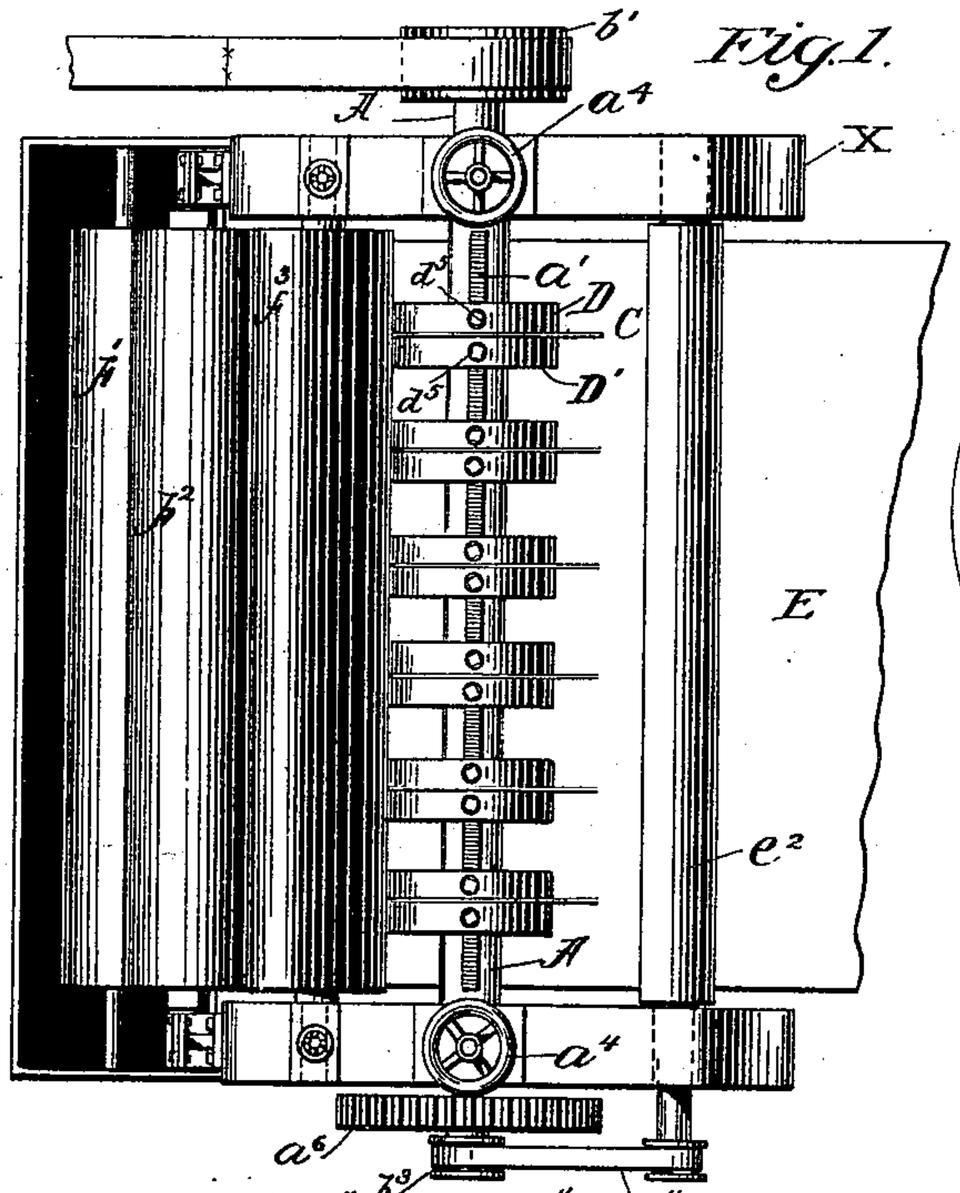


Fig. 2.

Fig. 3.

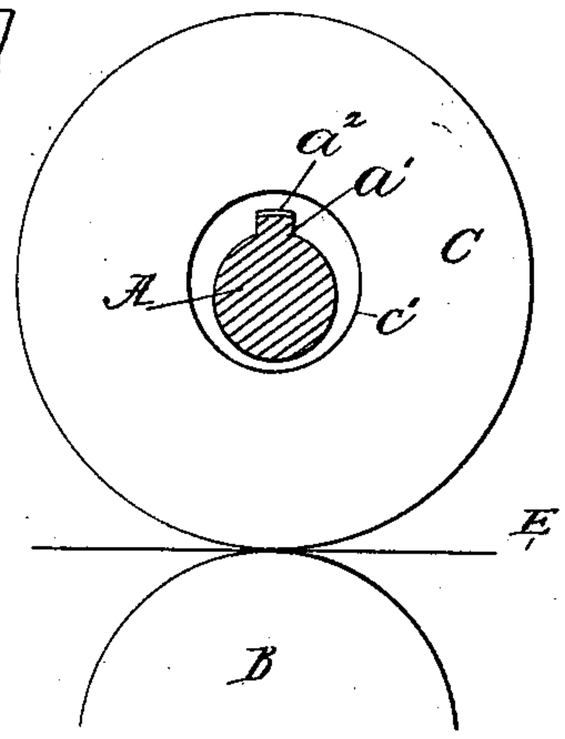


Fig. 4.

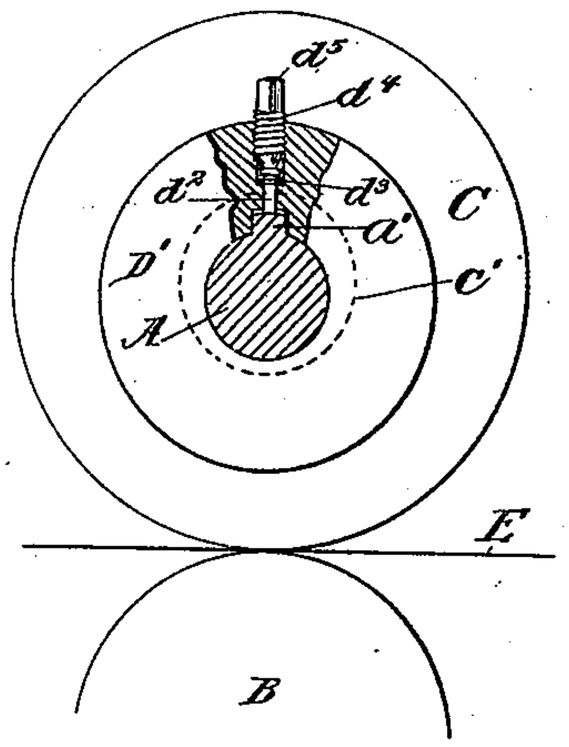
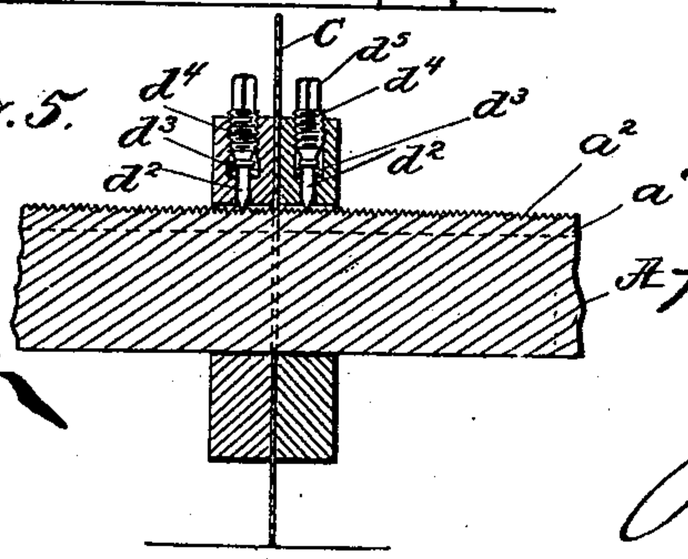


Fig. 5.



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his ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

B. KARFIOL.

DEVICE FOR RULING PAPER.

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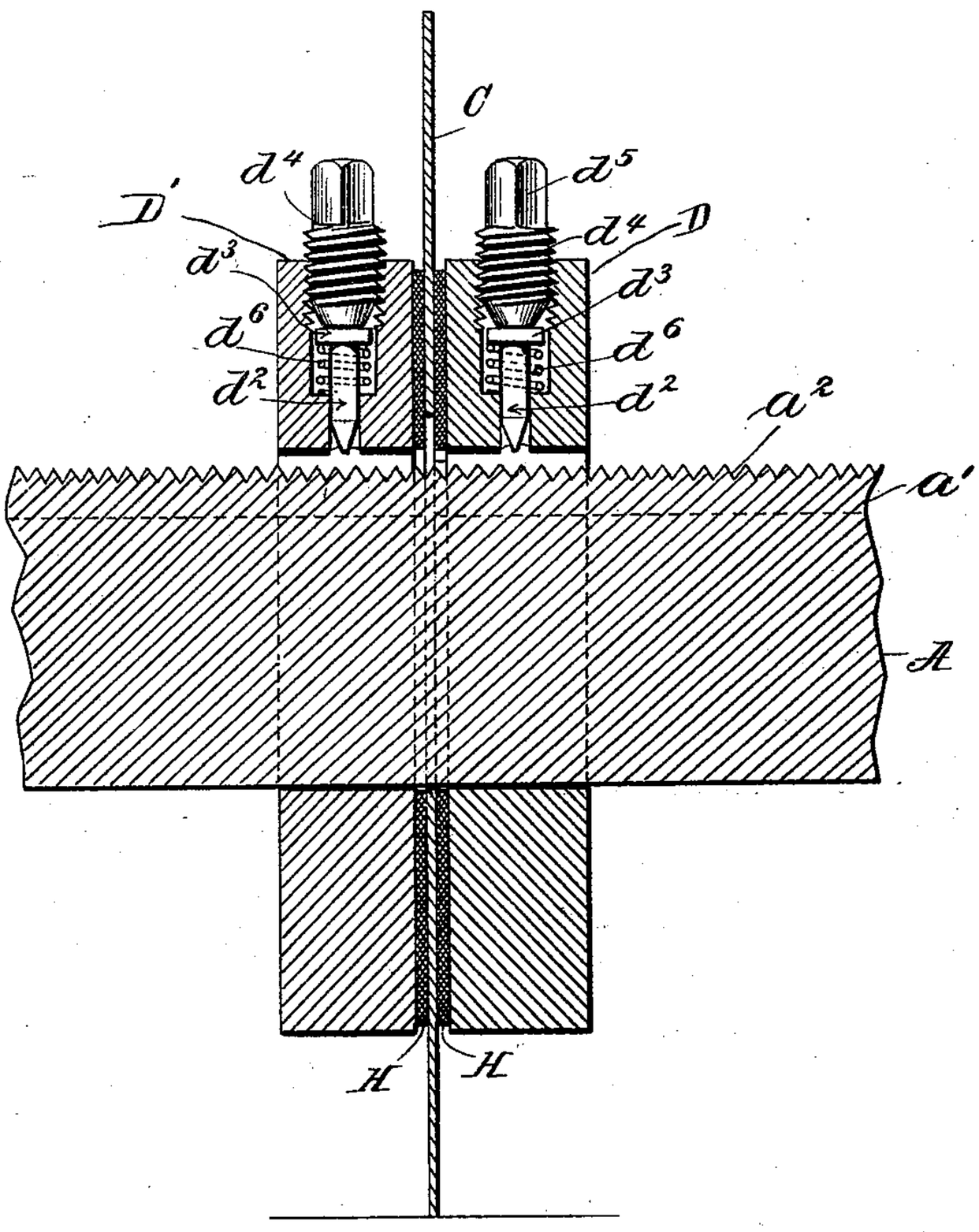
Fig. 6.



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UNITED STATES PATENT OFFICE.

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DEVICE FOR RULING PAPER.

SPECIFICATION forming part of Letters Patent No. 561,996, dated June 16, 1896.

Application filed December 20, 1894. Serial No. 532,420. (No model.)

To all whom it may concern:

Be it known that I, BENZION KARFIOL, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Devices for Ruling Paper, of which the following is a specification.

My invention relates to an improvement in apparatus for ruling lines on paper, and particularly to the arrangement of a disk in relation to a movable printing-bed for this purpose, which will print a line of regular and uniform weight, and to this end will not be affected by any irregularity in the thickness of the paper or other irregularity in the mechanism, but will by its automatic action compensate for such irregularity.

I have illustrated my invention in the accompanying drawings, in which like letters refer to like parts.

Figure I is a top view of the device; Fig. II, a side elevation of the same. Fig. III is a sectional view of the printing-disk and shaft, taken at right angles to the shaft. Fig. IV is a section of the shaft, taken at right angles to the shaft, showing the supporting-disk partly in section and the printing-disk. Fig. V is a sectional view of the shaft, disk, and guides, taken through the axis of the shaft and parallel therewith. Fig. VI is an enlarged drawing similar to Fig. V and showing the springs d^6 and friction-contacts H and H.

X is a frame suitably constructed to carry the necessary rollers and shafts employed.

x' and x' are ways adapted to carry the movable bearings a^3 and a^3.

A is a shaft journaled in the movable bearings a^3 and a^3, the position of which is adjusted by the screws a^4 and a^4. The shaft A is provided with the rib a', which on its surface is corrugated or provided with a file-surface a^2. At one end it is provided with the gear-wheel a^6.

B is a roller suitably journaled. Its shaft is provided at one end with the pulley b' and at the other end with the gear-wheel b^2.

C is a disk having a central aperture c'. This aperture is of greater diameter than the shaft A, upon which it is loosely mounted by friction-bearings, as hereinafter described. D and D′ are also disks having a central aperture of a size to fit closely the shaft A and allow for the rib a'. These disks are also provided with a set-screw to mesh with the file-surface a^2 of the rib a'. The construction of a suitable set-screw is shown in Fig. IV, where a portion of the disk D′ is broken away to show the construction, and in Fig. VI, where the same is shown in section.

d^2 is a chisel-edged bolt with a head d^3. Between this head and the base of the aperture rests a spiral spring d^6, with its tension directed to hold the bolt d^2 out of engagement with the file-surface a^2. The screw d^5 screws into the aperture d^4 and bears on bolt d^2 to cause the same to mesh with the file-surface a^2 and to lock the disk to the shaft.

The disk C is run upon the shaft A, and it is sustained between the disks D and D′ in a position at right angles to the shaft A and the roller B. The disk C may be adjusted to any position on the shaft A by releasing the set-screws d^5 and d^5 and moving the disks to the desired position on the shaft and then fixing the screws. The disks D and D′ are each preferably provided on the side on which they engage the disk C with a washer of leather or other bearing-surface that will provide a suitable friction-contact, (indicated as H and H.)

I have shown six of these printing and supporting disks. They are all identical.

F is an ink-well.

f' f^2 f^3 are ink-rollers to convey the ink from the well to the printing-surface of the disks C.

E is the paper passing between the guide-rollers e' and e^2, e^2 having a pressure-spring e^3, thence between the roller B and printing-disks C, and thence to the roll e^4.

G is a shaft carrying a circular brush g', engaging the under surface of the roller B and operated by the pinion g^2, which meshes with the gear-wheel b^2.

The roller e' is operated by the band b^4 about a pulley on the end of the roller e' and the pulley b^3.

The adjustment of the device is as follows: Power is conveyed to the shaft upon which is mounted the roller B by the pulley b', thence through the gear-wheel b^2 to the gear-wheel a^6, operating the shaft A in a direction opposite to the motion of roller B. The pin-

ion g' also operates the brush G. The ink-rollers being in contact with the disk C revolve therewith, and, as heretofore stated, the band b^4 operates the rollers e' and e^2 to feed the paper. The position of the shaft A is regulated by the hand-screws a^4 and a^4, and it is so adjusted that the axis of the shaft is out of the center of the disk C in the direction of the roller B—that is to say, in a position eccentric to the center of the disk C.

In the drawings I have shown the shaft A geared to the roller B and operating therewith. In this arrangement there is of course but little space for the adjustment of the shaft A in its relation to the disk C, the operation of which will be hereinafter described. I desire to state, therefore, that I may omit the gear-wheel a^6 and allow the disks C to be revolved by contact with the paper as it is carried over the roller B. I prefer, however, to use the arrangement shown in the drawings—that is to say, the roller and shaft geared to operate together, but in different directions.

The operation of the device is as follows: The paper E is introduced between the guide-rollers e' and e^2 and by their movement carried forward to pass between the roller B and the printing-disks C, thence to the roll e^2.

As heretofore related, the shaft A is adjusted to a position eccentrical to the center of the disk C, and the disk C is loosely mounted on the shaft A, the aperture of the disk C being somewhat larger than the shaft A, and the disks D and D', which are secured to the shaft A and provided with surfaces bearing on the disk C suitable to make a friction contact, sustain the disk C in a position at right angles to the shaft and the roller. As, therefore, the shaft and roller revolve together, either by their gearing together or the disks revolve by their contact with the roller or the paper and roller as it passes through the press, the disks C are caused to perform a movement eccentric to the axis of the shaft A—that is to say, as the disk C engages the printing bed or roller B in its revolution it is constantly forced upward between the friction-bearings of the disks D and D'. The degree of pressure with which the disks D and D' bear on the disk C of course determines the degree of pressure with which the disk C will bear on the roller B. This is, therefore, a matter of adjustment. It will be observed, however, that by this arrangement the disks C in their revolution constantly bear on the roller B with a relatively even pressure, and it is further manifest that should any obstacle be placed in the way of the disk C as it revolves—as, for instance, an increase in the thickness of the paper as it passes through—the disk will yield to such irregularity and will be pressed farther up between its friction-bearings—*i. e.*, disks D and D'—and should there be a depression in the printing-bed or paper the disk C will in like manner follow such irregularity without materially affecting the degree of pressure to which the same is adjusted.

In Fig. 3 I have shown a section of the shaft and disk, III, where the eccentrical position of the shaft to the disk may be readily seen.

As heretofore stated, the system of ink-rollers supply the disk C with ink as they revolve. I provide the revolving brush g' to make contact with the roller B and wipe off any moisture, dust, or ink that may cling to the same.

I have stated that I may adjust the printing-disks to any position on the shaft. I may also, where I desire to print two lines very close together, put two of such disks together between the friction-bearings.

What I claim is—

1. In a ruling-machine the combination of a movable printing-bed and a shaft upon which is run a disk having a central aperture of greater diameter than the shaft, and means secured to the shaft to support the disk, at right angles to the shaft and printing-bed, by friction-bearings, the disk bearing on the printing-bed and revolving with the movement thereof, eccentrically to the axis of the shaft substantially as described.

2. In a ruling-machine the combination of a roller and a shaft in the same plane, geared to revolve together but in different directions, a disk with a central aperture run upon the shaft—said aperture being of greater diameter than the shaft—and means secured to the shaft to support the disk at right angles to the shaft and roller by friction-bearings, the disk bearing on the roller and revolving therewith eccentrically to the shaft substantially as described.

3. In a ruling-machine the combination of a movable printing-bed, and a shaft parallel thereto, a printing-disk with a central aperture run upon the shaft—said aperture being larger than the shaft—and held in a position at right angles to the shaft and the printing-bed, by disks adjustably secured to the shaft and supporting the printing-disk by frictional contact, the printing-disk bearing on the printing-bed and revolving with the movement thereof, eccentrically to the axis of the shaft, substantially as described.

4. In a ruling-machine the combination of a roller and a shaft in the same plane, geared to revolve together but in different directions, a printing-disk with a central aperture of greater diameter than said shaft, run upon the shaft, and supported thereon at right angles to the shaft and roller by adjustable friction-bearings secured to the shaft, the disk bearing on the roller and revolving therewith, eccentrically to the axis of the shaft substantially as described.

5. In a ruling-machine the combination of a roller and a shaft in the same plane, geared to revolve together but in different directions, a series of printing-disks, each having a central aperture, run upon said shaft, which is

of less diameter than the said apertures, said disks being supported by adjustable friction-bearings secured to the shaft in a position at right angles to the shaft and roller, the disk bearing on the roller and revolving therewith eccentrically to the axis of the shaft substantially as described.

6. In a ruling-machine the combination of a roller and a shaft in the same plane, geared to revolve together but in different directions, a series of printing-disks each having a central aperture, run upon said shaft which is of less diameter than the said aperture, said disks being supported by adjustable friction-bearings secured to the shaft in a position at right angles to the shaft and roller, the disks bearing on the roller and revolving therewith eccentrically to the axis of the shaft, and means to supply ink to the disks and a revolving brush in contact with the roller substantially as described.

Signed at New York, in the county of New York and State of New York, this 27th day of February, 1894.

BENZION KARFIOL.

Witnesses:

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WILLIAM M. MCKINNEY.