(No Model.)

# R. S. MATTHEWS.

## COMPENSATING GEARING.

No. 410,425. Patented Sept. 3, 1889.

Fig. 1.

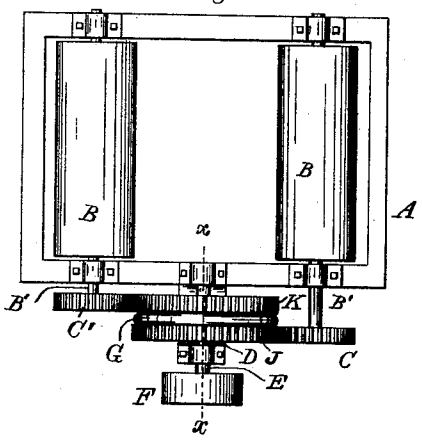



Fig. 2.

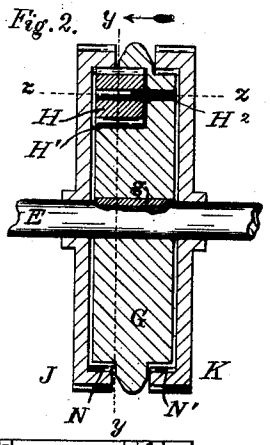



Fig. 6.

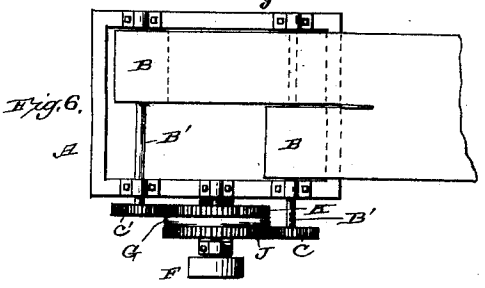



Fig. 3.

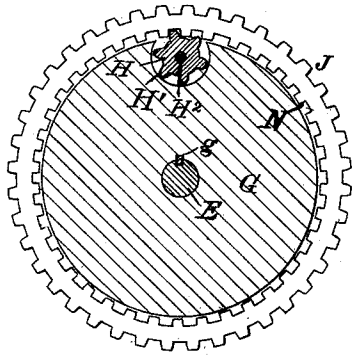



Fig. 4.

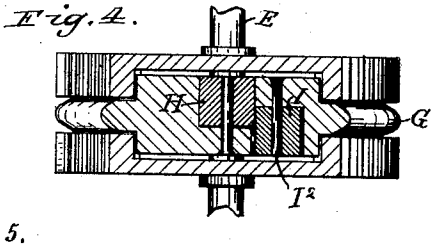
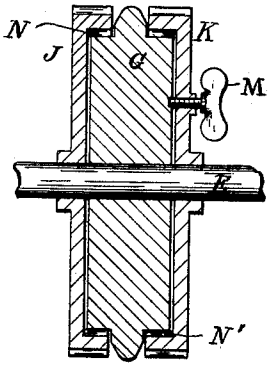



Fig. 5.




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# UNITED STATES PATENT OFFICE.

ROBERT S. MATTHEWS, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO JAMES SHELLINGTON, OF SAME PLACE.

## COMPENSATING GEARING.

SPECIFICATION forming part of Letters Patent No. 410,425, dated September 3, 1889.

Application filed March 14, 1889. Serial No. 303,290. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT S. MATTHEWS, of Rochester, county of Monroe, and State of New York, have invented certain new and useful Improvements in Compensating Gearing; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and the figures and letters of reference marked thereon.

My present invention has for its object to provide an improved compensating gear for use particularly in connection with the winding mechanism of a paper or similar machine, whereby two webs of paper may be wound by the same mechanism and each given an even tension, the whole power of the main shaft being equally distributed between them in proportion to the resistance offered, though the invention is equally well adapted for use in any position where such gearing is required.

The invention consists in certain novelties of construction and combinations of parts, all as will be hereinafter described, and the novel features pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a top plan view showing the application of the invention to the winding-rolls of a paper-machine; Fig. 2, a sectional view on the line *x x* of Fig. 1; Fig. 3, a section on the line *y y* of Fig. 2; Fig. 4, a section on the line *z z* of Fig. 2; Fig. 5, a section showing the manner of locking the gear for driving a single roll. Fig. 6 is a top plan view showing the application of the invention to the winding-rolls of a paper-machine, the web of paper being severed longitudinally and the two portions mounted on separate rolls.

Similar letters of reference in the several figures indicate similar parts.

The letter A indicates a frame in which the winding-rollers B B are journaled, each adapted to receive a web of paper from a paper-machine, whether the full width of the roll, as shown in Fig. 1, or a portion of a single web severed longitudinally by the usual devices, as shown in Fig. 6.

Upon the ends of the shafts B′ B′ are provided gears C C′, by which they are positively driven from the compensating gear forming the subject-matter of my present invention.

D represents a supplemental frame having a suitable bearing thereon, in which and a corresponding bearing on the main frame is journaled a shaft E, having a driving-pulley F thereon, as shown, driven positively from any suitable motor, and preferably at the or about the same surface speed as the web of paper is delivered from the machine, if the device is attached to one.

G represents a disk secured to shaft E by a key or spline *g*, entering keyways or grooves in the disk and shaft, respectively, and having in its periphery recesses H′ and I′, extending from opposite sides, in which are located small pinions H and I, said recesses communicating with each other, so as to permit the pinions to intermesh, as shown, causing them to rotate in opposite directions, and these pinions may either be permitted to rotate in the recesses (the ends of the teeth forming bearing-surfaces) or else bearing-pintles $H^2$ $I^2$ may be provided, on which they are journaled, as shown, which latter construction I prefer in practice. The peripheries of the pinions project a short distance beyond the periphery of the disk; but they are a little more than half the thickness of the latter, so that they will engage for a portion of their length; but their outer ends will operate in different vertical planes when the disk is rotated.

Arranged loosely upon the shaft E, and on opposite sides of the disk, are gears J and K, the teeth on their exteriors meshing with the gears C and C′, respectively, on the roll-shafts, and each being recessed on the side toward the disk, so that it will project over the latter and partly inclose it between them. On the inside of this overhanging portion the gears are provided with inwardly-projecting teeth N N′, adapted to mesh with the pinions H and I, so that motion of the disk will be imparted to both equally if the tension upon the rolls is equal.

The operation will now be readily understood. Assuming the webs secured to the rolls B B, the shaft E is rotated, and if the tension on the rolls and the resistance to the

rotation of the gears J and K are equal the pinions H and I, connecting the disks and gears, will be carried around locked, acting as driving projections and positively rotating both gears and distributing the power between them. If, however, it be necessary that one roll should rotate slower on account of its larger size—say the one connected to gear J—the pinions will turn on their axis at a speed proportioned to the difference in the speed between the two gears, the power being equalized as before, the operation being identical with the others of this class of devices employing independent gears driven by the bodily rotation of the compensating pinions connecting them.

By recessing the proximate sides of the gears connected to the rolls I am enabled to make the device very small and compact, and at the same time protect the operating parts from dust and dirt, the gears forming an inclosing-casing. Also, connecting these gears by intermeshing pinions adapted to rotate in opposite directions enables me to make the gears precisely alike, requiring but one pattern from which to cast them both, and the castings requiring no fitting save the boring of the central bearing for the accommodation of the shaft on which they are mounted. The central disk carrying the gears also requires very little fitting, being formed with the recesses for the pinions in it; but this construction is not essential, nor is it essential that a disk be employed at all; but the gears might be connected to the shaft in any similar manner. However, in general use I prefer the disk both for cheapness and because it serves as a counter-balance for the gears on the side of the shaft opposite them.

This device can be made so cheaply and is so compact that it will at once commend itself.

Of course this gear can be used for any purpose where compensating gears are desired, and the embodiment shown is simply one manner in which it is put in practical operation.

In the practical operation of this device in connection with paper-winding machines it is sometimes desirable to use only one winding-roll, and in this event one of the gears must be locked to the disk on the shaft; otherwise the pinions, which form the only connection between the disks and gears, would simply turn on their pintles without driving the gears; therefore I provide a thumb-screw M, passing through gear K, and arranged, when secured in, to engage the disk and lock the gear to it, as shown in Fig. 5.

I claim as my invention—

1. The combination, with the driving-shaft, the disk secured thereto, and the two intermeshing pinions carried by the disk, with their outer ends projecting in different planes, of the two gears mounted loosely on the shaft on opposite sides of the disk, with the teeth of each engaging one of said pinions, substantially as described.

2. The combination, with the driving-shaft, the disk secured thereto, and the two intermeshing pinions carried by the disk and projecting from the periphery of the disk in different planes, of the two gears mounted loosely on the shaft, one on each side of the disk, having the recessed sides and the internal gear-teeth for co-operating with the pinions, substantially as described.

3. The combination, with the driving-shaft, the disk secured thereto, having the recesses in opposite sides near the periphery communicating with each other, and the pinions in the recesses intermeshing and having their outer ends in different planes, of the gears mounted loosely on the shaft, one on each side of the disk, having recessed sides, and the internal gear-teeth co-operating with the pinions, substantially as described.

ROBERT S. MATTHEWS.

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