(No Model.) 2 Sheets—Sheet 1.

M. L. METZGER. & A. COOPER.

VARIABLE FRICTIONAL POWER TRANSMITTER.

No. 313,831. Patented Mar. 10, 1885.

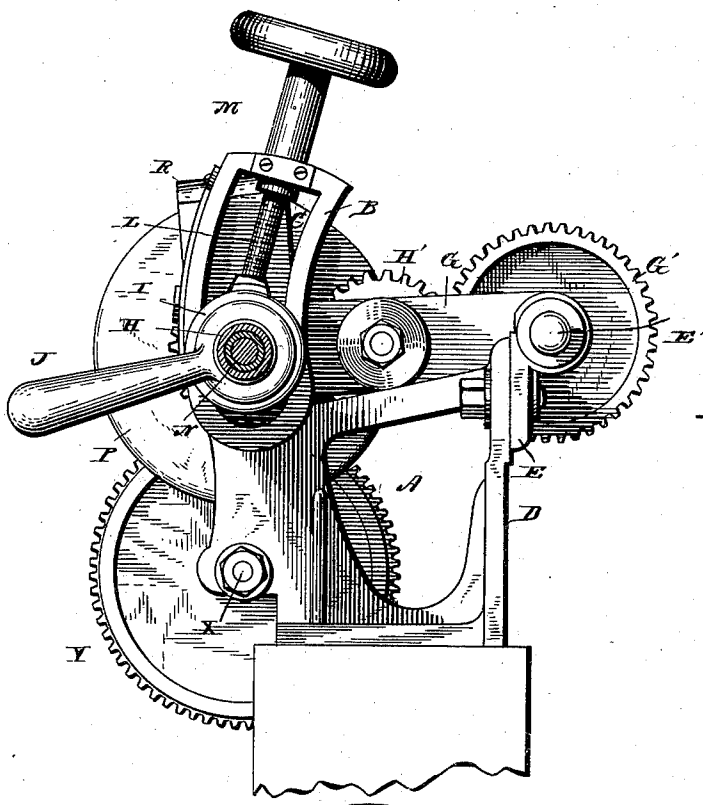


Fig. 1.

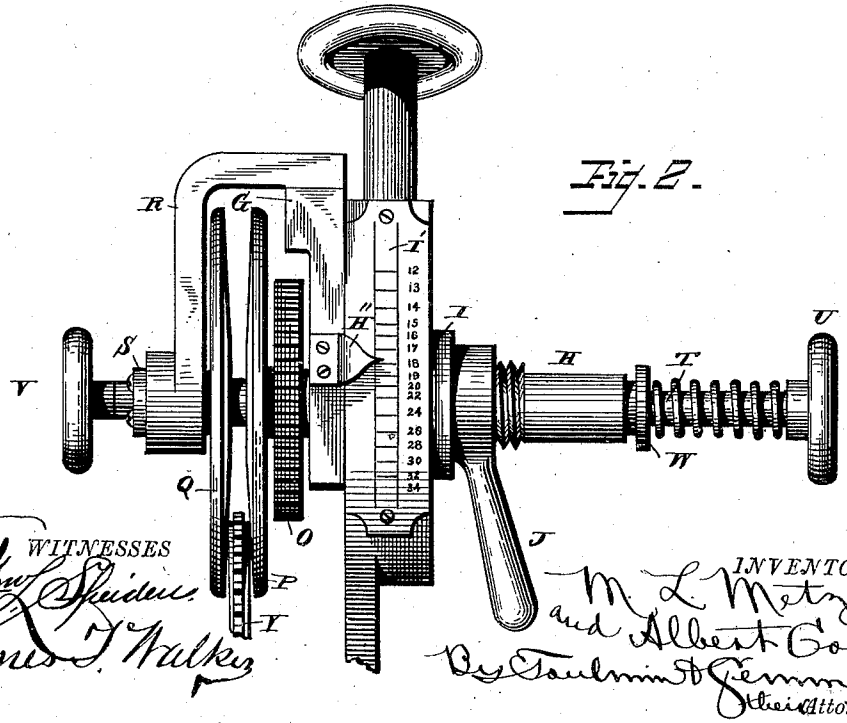


Fig. 2.

WITNESSES

Jno. L. Snideer.

James T. Walker

INVENTOR

M. L. Metzger.

and Albert Cooper.

By Taulmin & Semmes,

their Attorneys.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

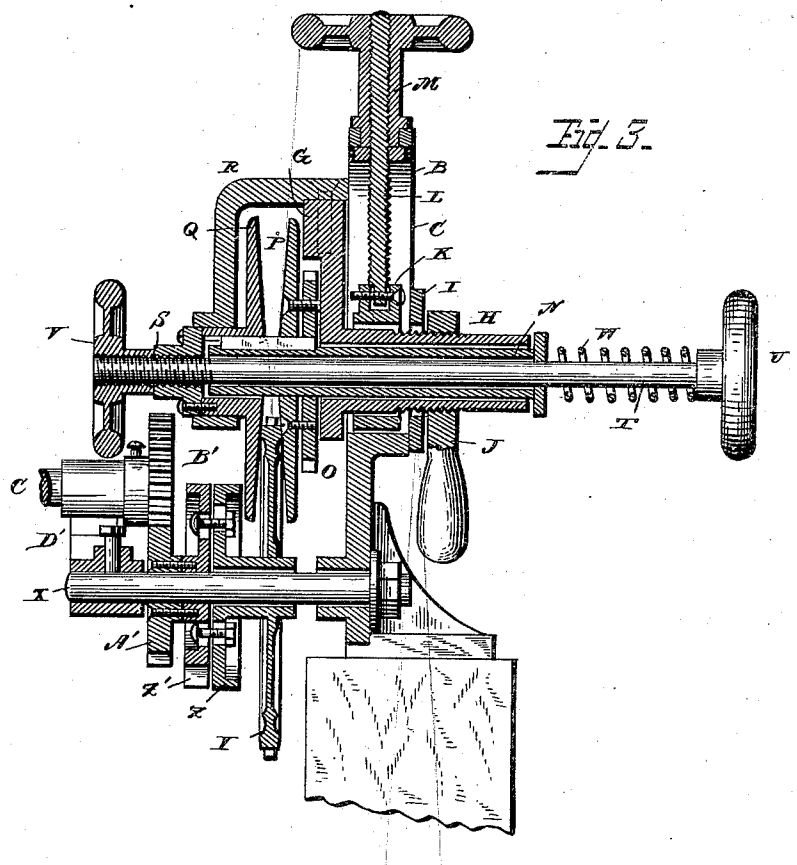


Fig. 4.

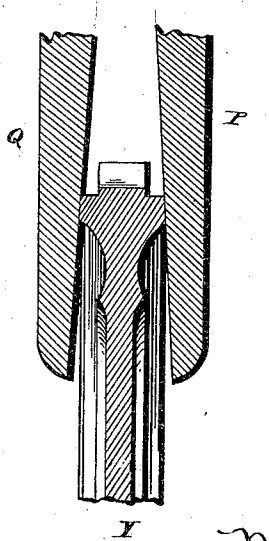
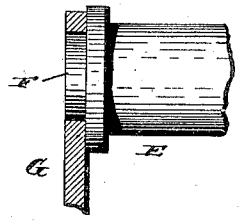


Fig. 5.



WITNESSES

Thos. L. Sheldon.

James L. Walker

INVENTOR

M. L. Metzger and Albert Cooper

By Taulmin & Semmes

their Attorneys.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

MARTIN L. METZGER AND ALBERT COOPER, OF HARRISBURG, PA.

VARIABLE FRICTIONAL POWER-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 313,831, dated March 10, 1885.

Application filed January 21, 1885. (No model.)

To all whom it may concern:

Be it known that we, MARTIN L. METZGER and ALBERT COOPER, citizens of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Variable Frictional Power-Transmitters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in variable frictional power-transmitters, being specially designed for use in connection with paper-ruling machines; and it has for its objects, first, to provide a variable power-transmitter—that is to say, mechanism which shall transmit the driving-power to the operative parts of a machine without any loss of motion, and which shall be capable of varying, by a gradual increase or decrease, the speed of the devices to be driven from the maximum to the minimum within the range for which the such mechanism is constructed, and embracing every possible fractional variation within such range; and, second, to combine with such a power-transmitter a graduated scale and pointer whereby the variation in the speed which the transmitter shall impart may be predetermined.

In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 represents a side elevation of our improved power-transmitter; Fig. 2, a front elevation of the same; Fig. 3, a vertical diametrical sectional view thereof, showing the internal arrangement of the several parts; and Fig. 4 a like sectional view of a portion of the upper and lower power-transmitting disks. Fig. 5 represents the journal-bearing.

The letter A indicates a frame, preferably metallic, and of such construction as to be readily attached to the frame of a ruling-machine such as that described in our application for Letters Patent for an improvement in ruling-machines filed March 17, 1884. This frame is provided with a standard, B, having a curved slot, C, formed therein. It is further provided with a vertical extension, D, to which is adjustably connected, preferably by means of a bolt, a journal-bearing, E, having a stud, F. An arm, G, is mounted at one end on this stud, and is provided at the other with a sleeve, H, having a portion of its exterior screw-threaded. The adjacent faces of the standard B and the arm G are preferably planed off, so as to work smoothly together, and a washer, I, is fitted over said sleeve and against the extension B, a hand jam-nut, J, being employed to bind the washer and arm firmly against said extension, so as to fix the position of the arm. A collar, K, is fitted to the sleeve H and within the slot C, and an adjusting-rod, L, is pivotally connected with the sleeve, and extended through an interiorly-threaded hand-wheel, M, swiveled in the upper portion of the standard B. By this means vertical adjustment of the arm G is effected, the arc of the slot C being described from the center of the stud F.

The letter N indicates a second sleeve, mounted for the greater portion of its length within the sleeve H of the arm G. A gear-wheel, O, is rigidly keyed to the sleeve N, as is also a disk, P, the said gear and disk being connected together by screws. Another disk, Q, associated with the disk P, is mounted on the said sleeve, the key which secures the other disk and the gear extending into a key-seat formed in the same. This latter disk, Q, however, is capable of a movement on the sleeve in the direction of its axis, but is made to move positively with the sleeve in a rotary direction. A bracket, R, is secured firmly at one end to the upper portion of the arm G, and is provided with an aperture near the lower end, which receives the hub of the disk Q, whereby said disk and that end of the sleeve are given support. To the hub is secured, preferably by means of screws, an internally-threaded block, S.

In order to adjust the disks P and Q to and from each other by sliding the movable disk Q to and fro on the sleeve N, we provide a binding-rod, T, which passes through said sleeve and block, the block being screw-threaded to correspond with the threads on the rod. At one end this rod is provided with a hand-wheel, U, whereby it is actuated, and at the other with a jam-nut, V, whereby the same is locked in relation to the block S. In order, however, to allow of the disks accommodating themselves to any slight uneven-

ness between their inner faces and the exterior of the disk, to be presently described, we interpose between the sleeve N and the hand-wheel U a washer and spiral spring, W. Extending from this frame A is a stout shaft, X, upon which are mounted the disk Y and the cams Z and Z′, having, respectively, one and two offsets in their peripheries, the two cams being rigidly connected together and also to the said disk, so that they will rotate synchronously. The periphery of this disk is provided with gear-teeth, and the opposite faces of the same, near the periphery, are beveled off in lines which converge as they extend outwardly, as more clearly represented in Fig. 4. These beveled surfaces are designed to be quite narrow, measuring them in a radial direction, and the inner or opposite faces of the disks P and Q are also beveled in diverging lines from their center outward, the bevel of the respective upper disks agreeing in direction with the narrow bevel surfaces of the lower disk, with which they respectively come in contact. By this means we have ascertained that the upper disks can be so firmly impinged against the lower disk as to cause the latter to rotate positively when the former are rotated and with entire smoothness and regularity. It should further be observed that it is necessary that the surfaces of the lower disk which come in contact with the upper disks should be narrow, as intimated, otherwise the effect of binding the upper disk against the lower is to cause the upper disks to slip by the lower, as the friction on each side of a vertical line neutralizes itself and thereby practically prevents the lower disk from rotating.

The cams Z and Z′, above described, are designed to operate the stop-gate shaft in a ruling-machine, as more clearly set out and shown in an application above alluded to. The mechanism which is designed to operate the shaft carrying the cam-heads, which in a ruling-machine actuate the pen-lifters, consists of the pinion A′, mounted on the shaft X, and connected to the cam Z′. This pinion A′ meshes with the pinion B′, mounted on the shaft C′, that being the shaft which in ruling-machines carries the cam-heads just alluded to, and which is supported by the bracket D′, secured to the shaft. A shaft, E′, is mounted in the journal E, secured to the frame A, as above described, and is designed to be provided at one end with a driving-pulley and at the other end with a gear-wheel, G′, the latter meshing with an idler-pinion, H′, mounted on a stud projecting from the arm G. This pinion also meshes with a gear-wheel, O, secured to one of the disks, whereby rotary motion is imparted to the frictional disks; but in order to vary the speed which the upper disks transmit to the lower disk and such mechanism as receives motion from the latter, it is necessary to adjust the upper disks in a radial direction, so as to bring the point of contact between them and the lower disk at different distances from their center. This is done by operating the hand-wheel U so as to raise or lower the sleeve N, and consequently the upper disks, in the slot C. This varies the point of contact between the upper disks and the lower disk with respect to the center of the former, and, as a consequence, the speed of the latter, without changing the speed of the former. Now, in order to predetermine the speed at which the lower disk shall be driven and the relative speed of the other devices which are primarily actuated through said disk, we provide a pointer, H″, connecting it with the arm G, and a graduated scale, I′, mounted stationarily upon a fixed object—in the present instance upon the standard B of the frame A. The lines on this scale, in the present instance, are consecutively numbered 12 to 20, inclusive, and are numbered from 20 to 36, inclusive of the latter, increasing 2 at each graduation, and the position of the pointer with respect to this scale will determine the speed of rotation of the lower disk.

The following is the rule of adjustment when this power-transmitter is used in connection with a ruling-machine: In ruling lines from six to twelve inches, exclusive of twelve inches, the cam having two offsets is used, and the pointer is set on the scale at double the number of inches to be ruled. In ruling lines between twelve inches and upward, inclusive of twelve, the cam having two offsets may be used, but the single cam is generally used.

This device, though designed to be specially used with ruling-machines, it is obvious can be applied to many other purposes.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a power-transmitter, the combination, with the frame, the power-shaft, its gear-wheel, and the idler-pinion meshing with said gear, of the two disks to one of which is secured a gear-wheel meshing with said pinion, and a third disk constructed to extend between and be engaged by said two disks.

2. In a power-transmitter, the combination, with the frame having a slot, the pivoted arm having a tubular extension adjustable within the slot, the sleeve within the extension, the disks mounted upon said sleeve, the gear carried by one of said disks, the power-shaft and its gear, and the interposed idler-pinion, of the disk mounted on a separate shaft, and constructed to be engaged by the said two disks.

3. In a power-transmitter, the combination of the frame having a slot formed therein, the arm, the tubular extension and collar fitted to said slot, the adjusting-screw and the hand-wheel, the sleeve within the extension, the disks with divergently-disposed faces, one rigidly and the other slidingly mounted on the sleeve, the binding-rod connected with the sliding disk, the jam-nut, and the spring between the sleeve and an enlargement on the rod, and the disk mounted on the separate

shaft, and provided with a narrow annular surface on each side and adapted to extend between and be engaged by the said two disks.

4. A power-transmitter constructed of two disks capable of being adjusted one from the other, and mounted upon an adjustable shaft, and a third disk constructed to extend between and be engaged by the said two disks, in combination with a pointer movable with the adjustable shaft, and a fixed graduated plate whereby the speed which the two disks impart to the third disk may be accurately regulated.

5. The combination, in variable frictional power-transmitter consisting, essentially, of the engaging frictional disk with a pointer and a fixed graduated plate, whereby the speed may be predetermined.

6. In a power-transmitter, the combination of the sleeve, the hollow shaft, and the two disks having divergently-disposed faces, the one rigidly and the other slidingly mounted on said sleeve, with the binding-rod connected with the sliding disk, the jam-nut, and the spring between the sleeve and an enlargement on the rod.

7. In a power-transmitter, the combination, with the frame having the curved slot, of the pivoted arm having a tubular extension, the collar fitted over said extension and within said slot, the adjusting-screw, the hand-wheel, and the jam-nut fitting the extension, whereby the position of the arm with respect to the slot in the frame may be adjusted and held.

8. In a power-transmitter, the combination, with the frame having a slot, the pivoted arm having a tubular extension adjustable within such slot, the sleeve within the extension, the two disks mounted upon said sleeve, the gear carried by one of said disks, the power-shaft and its gear and the interposed idler-pinion, and the disk mounted on a separate shaft and constructed to be engaged by the said two disks, of a pointer movable with the sleeve, and a fixed graduated plate whereby the speed may be predetermined.

In testimony whereof we affix our signatures in presence of two witnesses.

MARTIN L. METZGER.
ALBERT COOPER.

Witnesses:
EUGENE SNYDER,
RICHARD MILES.