

(No Model.)

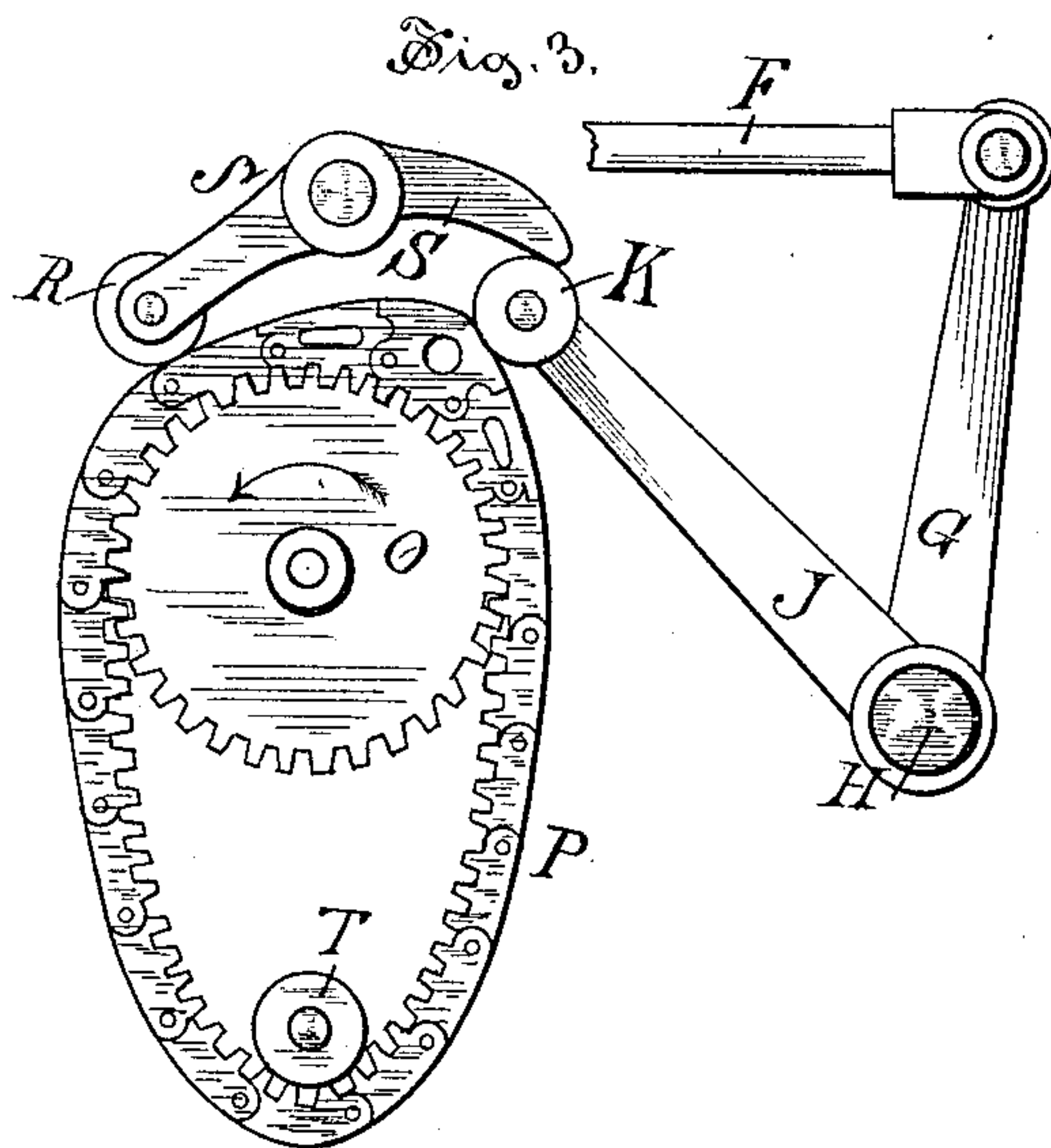
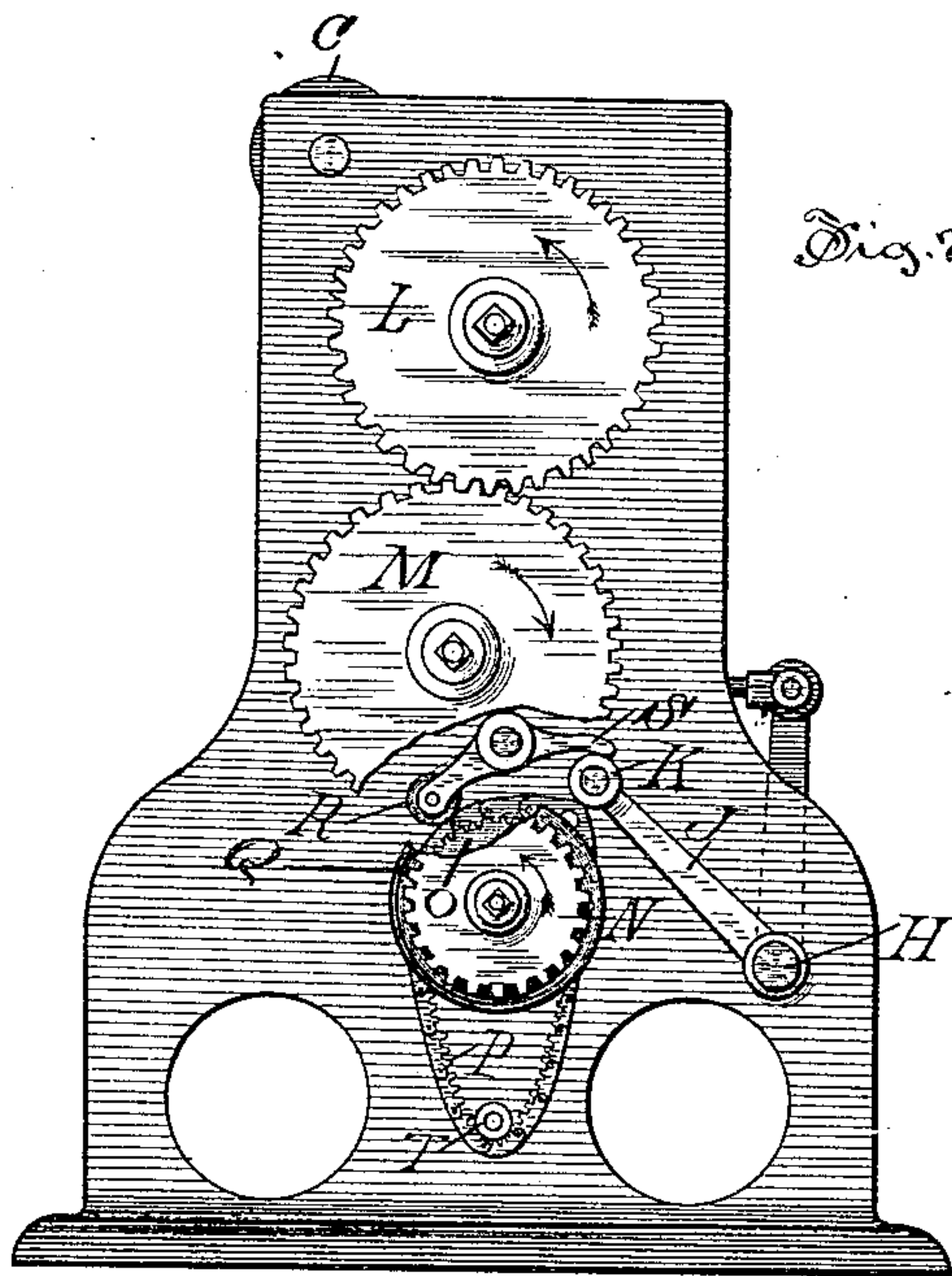
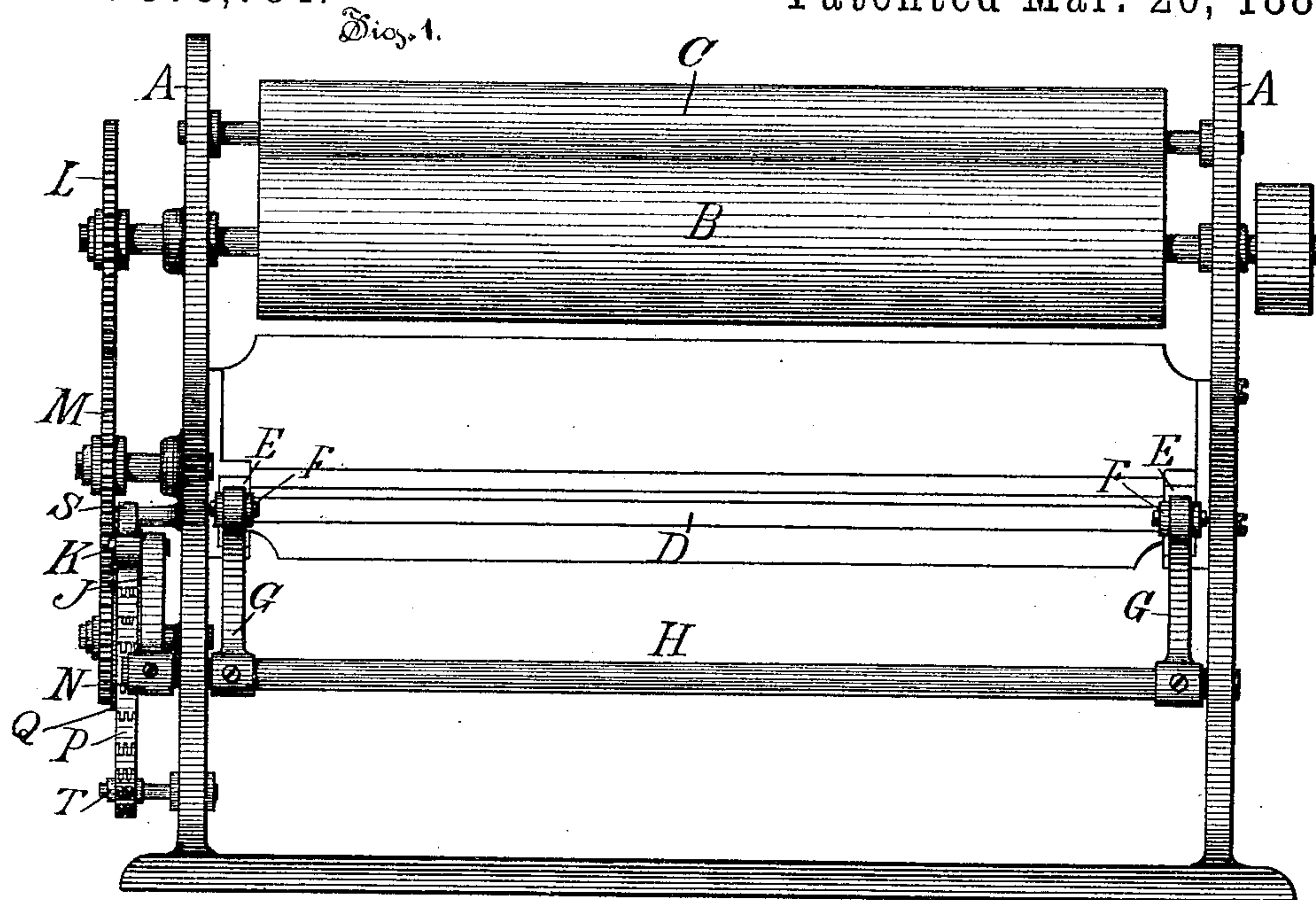
2 Sheets—Sheet 1.

W. F. HILL.

MEANS FOR OPERATING PAPER CUTTERS.

No. 379,784.

Patented Mar. 20, 1888.



Witnesses:

H. R. Williams,
C. B. Jenkins.

Inventor,
Wilber F. Hill,
By Millard Eddy
Atty.

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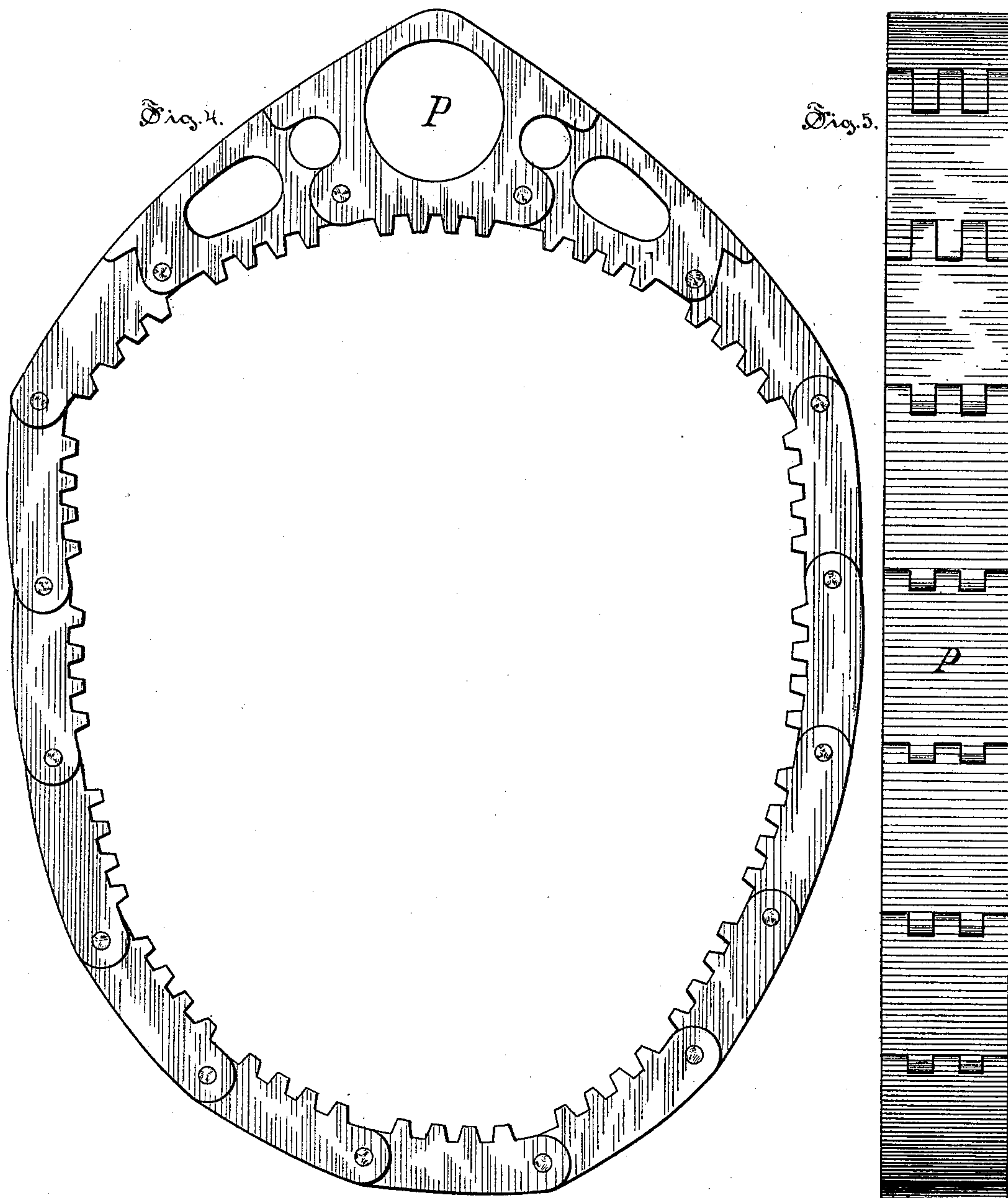
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UNITED STATES PATENT OFFICE.

WILBER F. HILL, OF MANCHESTER, CONNECTICUT.

MEANS FOR OPERATING PAPER-CUTTERS.

SPECIFICATION forming part of Letters Patent No. 379,784, dated March 20, 1888.

Application filed July 5, 1887. Serial No. 243,324. (No model.)

To all whom it may concern:

Be it known that I, WILBER F. HILL, of Manchester, in Hartford county, Connecticut, have invented certain new and useful Improvements in Means for Operating the Knives of Paper-Cutting Machines, &c., which improvements are described in the following specification, and are illustrated by the accompanying drawings.

My invention relates to paper-cutting machines of the general character shown and described in Letters Patent of the United States, Nos. 195,278 and 272,438, which were issued to me on the 18th of September, 1877, and on the 20th of February, 1883, respectively. Said machines are designed for cutting sheets of any desired length from a continuous strip of paper, which may be fed into the cutting mechanism from a roll or from a paper-making machine.

This invention relates more particularly to mechanism for driving the cutter or fly-knife of such machines, and involves the use of a gear-wheel and an interiorly-toothed expansion-gear chain, which is hereinafter described.

The best manner in which I have contemplated applying the principle of my invention is shown in said drawings, in which—

Figures 1 and 2 are a rear view and an end view, respectively, of a paper-cutting machine embodying my invention, while Figs. 3, 4, and 5 are details.

In the drawings, A denotes the frame of the machine.

B is the roll which feeds the paper to the cutter.

C is the pressure-roll which holds the paper to roll B.

D is the cutter-bar, which carries the cutter or fly-knife, and has a reciprocating motion in slides or grooves E E at each end of bar D. The cutter-bar D is moved by two connecting-rods, F F, which receive their motion from the rock-shaft H by means of rock-arms G G.

J is an arm, which is attached to rock-shaft H and is armed with an anti-friction roller, K.

L is a gear-wheel upon the shaft of roll B for communicating motion to the cutting mechanism.

M is an intermediate gear-wheel attached to a bearing upon frame A and driven by wheel L.

N and O are gear-wheels, likewise turning together on a bearing attached to frame A. The teeth of wheel N gear into wheel M, so that wheel O receives its motion from L through wheels M and N. Upon the wheel O runs the geared band or chain P, the inner side of which is provided with teeth meshing with the teeth of wheel O.

T is an adjustable loose pulley or roller which holds the slack of chain P. On each side of the teeth of wheel O are flanges Q, so as to hold the chain upon the wheel and prevent it from running off at the sides.

Chain P, as seen in detail in Figs. 3, 4, and 5, is composed of a number of links hinged together, and forming a toothed rim, which is adapted to fit upon wheel O. Fig. 3 is a side view of chain P, running upon the teeth of wheel O and actuating rod F through intermediate mechanism. Fig. 4 is a full-sized side view of chain P, while Fig. 5 is a full-sized outer edge view of the same. A certain number of the links composing chain P are made deeper than the rest, as seen in Figs. 2, 3, and 4, whereby said chain is converted into an expansion-gear. The outer edge of said chain engages both roller K of arm J and an anti-friction roller, R, which is carried upon an arm of an oscillating lever, S. This lever, being centrally pivoted upon a bearing attached to frame A, is adapted to oscillate to and from the position shown in Figs. 2 and 3, according as roller K or roller R runs up upon the above-mentioned deeper links of chain P. The links of chain P are removable and detachable from each other, so that the chain can be made of any desired length. The lengths are made with different numbers of teeth, so that by using different links, or a different number of links, the chain can be made longer or shorter, and can have different numbers of teeth in the entire circuit. This is for the purpose of bringing the before-mentioned deeper links of chain P to engage roller K at such a number of turns or parts of turns of wheel O as may be desired, and of thus regulating the length of the sheets of paper severed by the cutter to the extent of the small space represented by one of said teeth. In the drawings said teeth are one-eighth of an inch. By varying the length of chain P all sizes of paper can be cut, and the difference between

successive sizes can be diminished by reducing the size of the teeth upon said chain P and wheel O.

The operation of my invention is as follows: The uncut paper passes continuously between rolls B and C, the roll B being driven by any suitable power. This also drives the wheel O continuously. As the more shallow links of chain P pass over the wheel O the cutter does not operate; but when the deeper links pass under roller K they gradually raise that roller to the position shown in Figs. 2 and 3. This causes the cutter to advance and cut off a sheet from the continuous strip. As said deeper teeth pass on under roller R, they raise that roller away from the position shown in said Figs. 2 and 3, and turn lever S to such a position that roller K is thereby depressed to a position of contact with the shallower links of chain P. This causes the cutter to recede to its original position. In other words, the rotary motion of wheel O is converted into reciprocating motion in arm J by means of the described interiorly-toothed expansion-gear chain operating upon said arm through roller K to produce motion in one direction and through roller R, lever S, and roller K to produce motion in the opposite direction, and this motion of reciprocation is transmitted from arm J to the cutter-bar by means of rock-shaft H, rock-arms G G, and connecting-rods F F.

I claim as my invention and desire to secure by Letters Patent—

1. An endless chain which is composed of hinged links provided with interior teeth, and has a continuous external bearing-surface and a gradually-varying depth, substantially as and for the purpose specified.

2. An expansion-gear chain which is composed of a series of removable hinged links, and has a gradually-increasing and gradually-decreasing depth and an unbroken periphery, substantially as and for the purpose specified.

3. A gear-chain having a gradually-varying depth and a continuous external bearing-surface, in combination with a gear-wheel engaging said chain, and an arm having a roller which runs upon said bearing-surface and re-

ceives from said chain an intermittent reciprocatory motion, substantially as and for the purpose specified.

4. A gear-chain having a gradually-varying depth and a continuous external bearing-surface, a gear-wheel which is adapted to drive said chain, and a roller which is adapted to take up the slack of said chain, in combination with a roller which runs upon said bearing-surface, substantially as and for the purpose specified.

5. A gear-chain having a gradually-varying depth and a continuous external bearing-surface, a gear-wheel driving said chain, and an oscillating lever, S, which is impelled by said chain, in combination with mechanism which receives an intermittent reciprocating motion from said gear-chain and said oscillating lever, substantially as and for the purpose specified.

6. A gear-chain having a gradually-increasing and gradually-decreasing depth and a continuous external bearing-surface, a gear-wheel driving said chain, and an oscillating lever, S, which is provided with an anti-friction roller and is driven by said chain, in combination with a rock-shaft having an arm, J, which is provided with an anti-friction roller engaging said gear-chain and said lever, substantially as and for the purpose specified.

7. A gear-wheel and an expansion-gear chain running upon said wheel, in combination with an oscillating lever, S, having two arms, one of which engages said chain by means of an anti-friction roller, substantially as and for the purpose specified.

8. A gear-wheel, mechanism for driving said wheel, a gear-chain of gradually-variable depth running upon said wheel, and an oscillating lever having two arms impelled by said chain, in combination with a rock-shaft having an arm, J, which engages said chain and lever by means of an anti-friction roller, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my name in the presence of two witnesses.

WILBER F. HILL.

Witnesses:

WILLARD EDDY,
RICHARD H. MATHES.