

(No Model.)

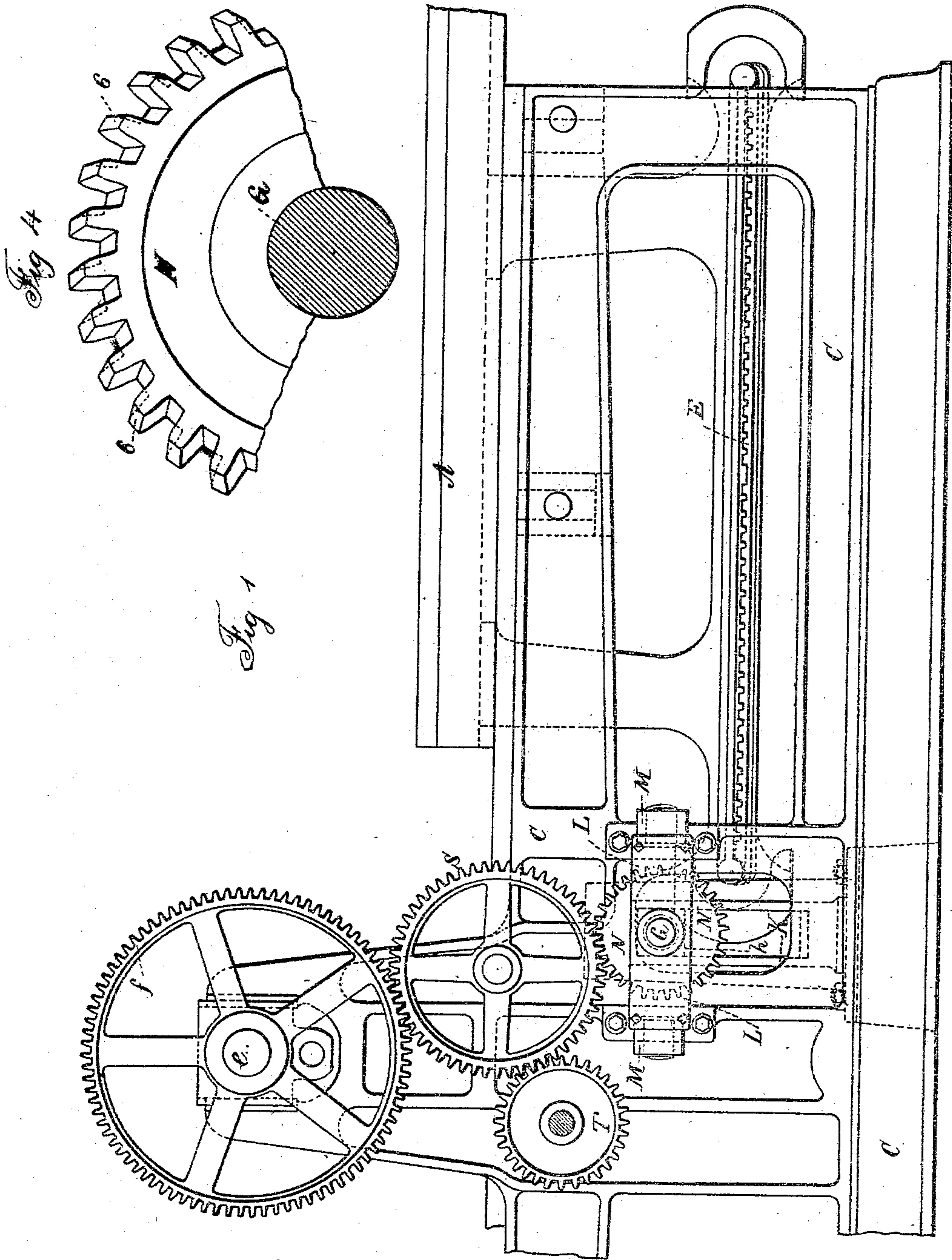
2 Sheets—Sheet 1.

W. SCOTT.

CYLINDER PRINTING MACHINE.

No. 321,539.

Patented July 7, 1885.



Witnesses

J. Stail
Chas. H. Smith

Inventor

Walter Scott

per Lemuel W. Serrell atty

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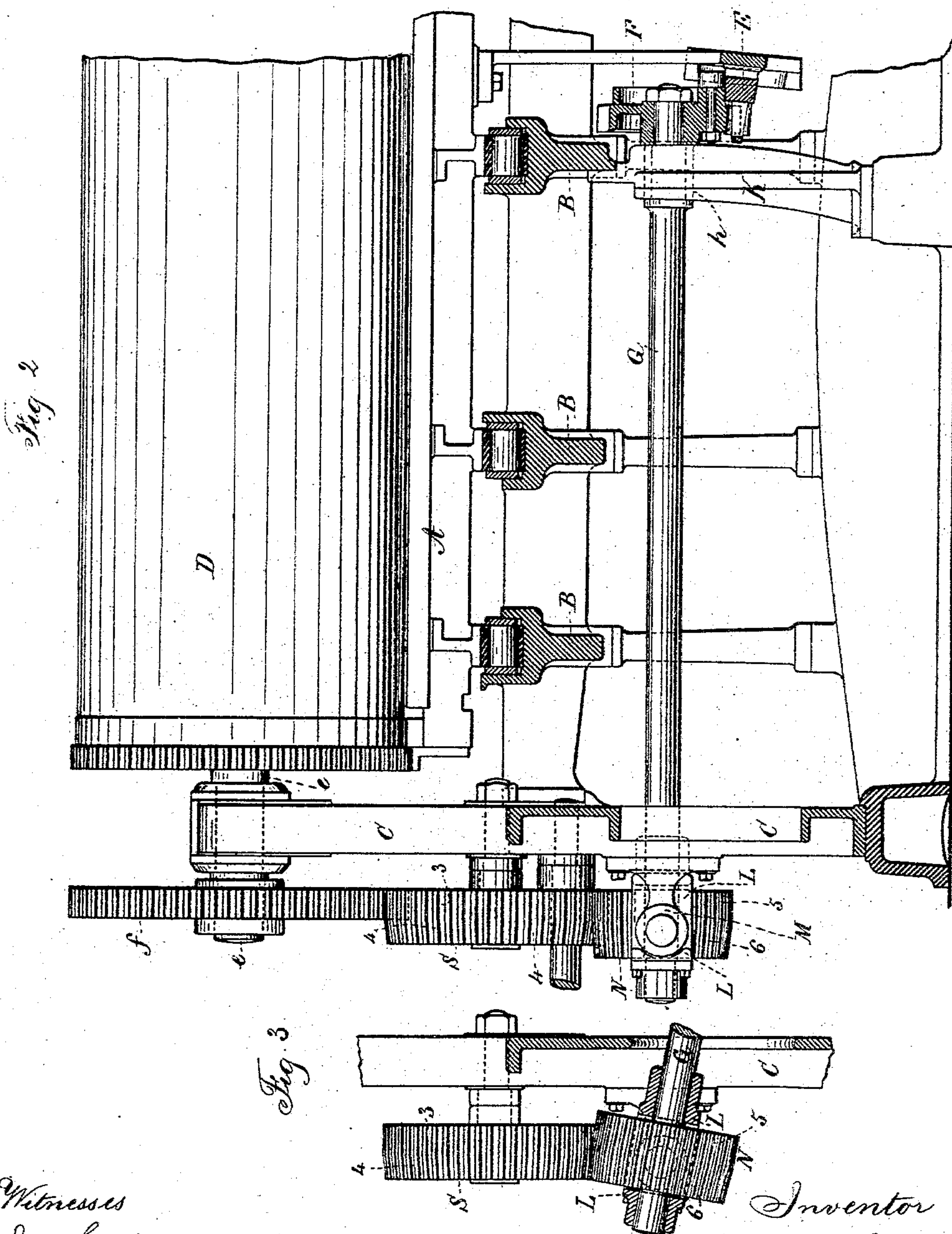
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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

CYLINDER PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 321,539, dated July 7, 1885.

Application filed June 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, of Plainfield, in the county of Union and State of New Jersey, have invented an Improvement in Cylinder Printing-Machines, of which the following is a specification.

In printing-presses with a reciprocating bed it has been usual to move the bed by a pinion that acts upon a rack affixed to the under side of the bed, and as the bed is moving in one direction the pinion is above the rack, and upon reaching the end of the rack such pinion rolls around the same and descends, and the rack passes back above the pinion. In this character of press it is very difficult to make the gearing work perfectly, because the shaft of the pinion swings up and down as the pinion rises and falls. Usually a universal joint is used to connect the swinging portion of the pinion-shaft with a fixed portion. This is liable to wear loose, and it produces an end-wise motion of the pinion on the rack and an irregular motion in the bed. In some instances the pinion that has been made use of in driving this shaft has been a double cone, so that when the rack-pinion is elevated one portion of the double conical gear is in gear with the driving-wheel on the shaft of the impression-cylinder, and when the rack-pinion is depressed the other portion of the conical gear is in gear with the driving-wheel. Gearing with a rising and falling shaft may be seen in the patent of A. B. Taylor, June 26, 1860, No. 28,915.

The object of my present invention is to obtain perfection in the action of the gearing, so that there will not be unequal wear upon the gear-teeth or looseness between them.

In the drawings, Figure 1 is a partial elevation of the press to represent the gearing. Fig. 2 is a cross-section showing the rack and portion of the impression-cylinder and gearing. Fig. 3 is an edge view of the compound gears when the pinion-shaft is depressed, and Fig. 4 is a separate partial view of one gear.

The type-bed A, bearers B, and frame C are of any desired character. The impression-cylinder D is provided with the shaft *e* and gear-wheel *f*, and upon the under side of the bed A there is the rack E, having teeth, the surfaces of which are inclined and adapted to

work with the pinion F, whether such pinion F is above or below the rack, and G is the shaft of the pinion F. Its box at *h* slides in a vertical slot in the frame at K. The outer end of the shaft G is received in a yoke, L, that is pivoted at its ends in the bearing-boxes M upon the frame C.

The parts thus far described, being known, do not require any particular description of the details of construction or mode of operation, and I remark that my improvement is available with any press of the general character indicated.

At the outer end of the shaft G there is the pinion N, and instead of said pinion N gearing directly into the wheel *f*, as heretofore usual, I prefer to make such wheel *f* smaller and to introduce a compound gear, *s*, between the gear *f* and the pinion N, and it is preferable to provide a driving-shaft and pinion, T, gearing into the compound gear S, so as to give motion to the same. The gear S is made with straight and parallel teeth at the portion 3 and with a beveled portion, 4, the teeth of which are continuations of the teeth in the portion 3. So in like manner the pinion N is compound, the teeth at 5 being straight and parallel and the teeth at 6 beveled, but continuations of the teeth 5.

The construction of the parts is such that when the pinion F is above the rack E the shaft G is horizontal and the teeth 3 of S gear into the teeth 5 of N, and these teeth being parallel, and parallel with the axis of the pinion, there is no difficulty in cutting the same so that their surfaces fit together throughout their length with the greatest accuracy. In like manner when the pinion F is below the rack and the shaft G assumes the inclined position, the bevel-gears 4 and 6 are in contact with each other, and the gears and teeth, being tapered from one common point, work together with the accuracy of such gears; and I remark that they should be cut in a bevel-gear-cutting engine, so that the teeth are accurate.

It will be observed that the compound pinion N is wider than the compound gear S, and that the axis of the yoke L is nearly in line with a plane passing through the compound gear between the straight and tapering teeth; hence when the parts are in the position shown

in Fig. 2 the parallel teeth are in gear with each other, and the sides of the gears S N next the frame C are in line with each other; but when the shaft G is depressed at its inner end the outer ends of the tapering teeth 6 are brought in line with the ends of the tapering teeth 4, and thereby the teeth 4 and 6 will take an even bearing upon each other throughout their entire length. If the axis of the wheel S is directly above the shaft G, the center of teeth 6 will be exactly in line with the centers of the teeth 5 and in radial planes passing through the axis of the shaft G; but when the wheel S is not exactly over the wheel N, as shown, the teeth 6 will require to be slightly inclined to the radial planes or made with a slight "skewback," as shown in the detached and enlarged view, Fig. 4, and the portions 4 of the teeth on the wheel S will require to have a corresponding skewback form. The necessity for this skewback upon the tapering portion of the compound pinion N will be apparent when it is considered that the shaft G swings up and down in a vertical plane; but this plane does not pass through the center of wheel S, and the point of contact of the teeth 6 with the teeth 4 is at one side of this plane; hence when the shaft G is depressed and the teeth 6 brought into contact with the teeth 4 the teeth would not bear upon each other throughout their entire length if the teeth 6 were in a radial plane passing through the center of G; hence to make the teeth 4 take a proper bearing upon the teeth 6, the teeth 6 must be slightly inclined to the radial plane or made with what is known as a "skewback." It is preferable to place the shaft G in about the position shown in Fig. 1, so that the proper supports may be introduced for the type-bed and its tracks directly below the impression-cylinder D. The intermediate wheel, S, allows for the use of a much smaller wheel, f, on the shaft of the impression-cylinder D than heretofore made use of; hence access is easier to the inking-rollers that are near the impression-cylinder. It will, however, be apparent that

my pinion N, with its compound teeth, might be used without the intermediate wheel, S; but when this intermediate wheel, S, is used, as shown, the aforesaid benefit is obtained, and the same is available if the shaft G rises above the horizontal line.

All the novel and patentable devices and combinations herein described and shown are my invention.

The following is a summary of the devices and combinations of devices which I now understand and am advised should be expressed in claims for the protection of the aforesaid invention.

I claim as my invention—

1. The combination, with the impression-cylinder, the bed, and a gear-wheel, f, upon the shaft of the impression-cylinder, of a toothed rack, E, connected with the bed, the pinion-shaft G, and pinion, said pinion being above the rack-teeth when its shaft is level and below the rack-teeth when the shaft is inclined, a compound gear, N, upon the pinion-shaft, and a compound gear-wheel, S, between the gear N on the pinion-shaft and the gear f upon the impression-cylinder shaft, said compound gear-wheels N S having teeth, the surfaces of one half of the length of each tooth being parallel with the axis, and the surfaces of the other half of each tooth tapering, for the purposes and substantially as set forth.

2. In combination with the bed, the rack, pinion and pinion-shaft, and bearings, of a compound gear on the pinion-shaft and a compound gear to drive the same, such compound gears being composed of teeth, the surface of one half the length of each tooth being parallel with the axis of the pinion, and the surface of the other half of each tooth tapering, for the purposes and substantially as set forth.

Signed by me this 29th day of May, A. D. 1884.

WALTER SCOTT.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.