(No Model.)

B. D. WHITNEY.

GEARING.

No. 343,937. Patented June 15, 1886.

Fig. 1.

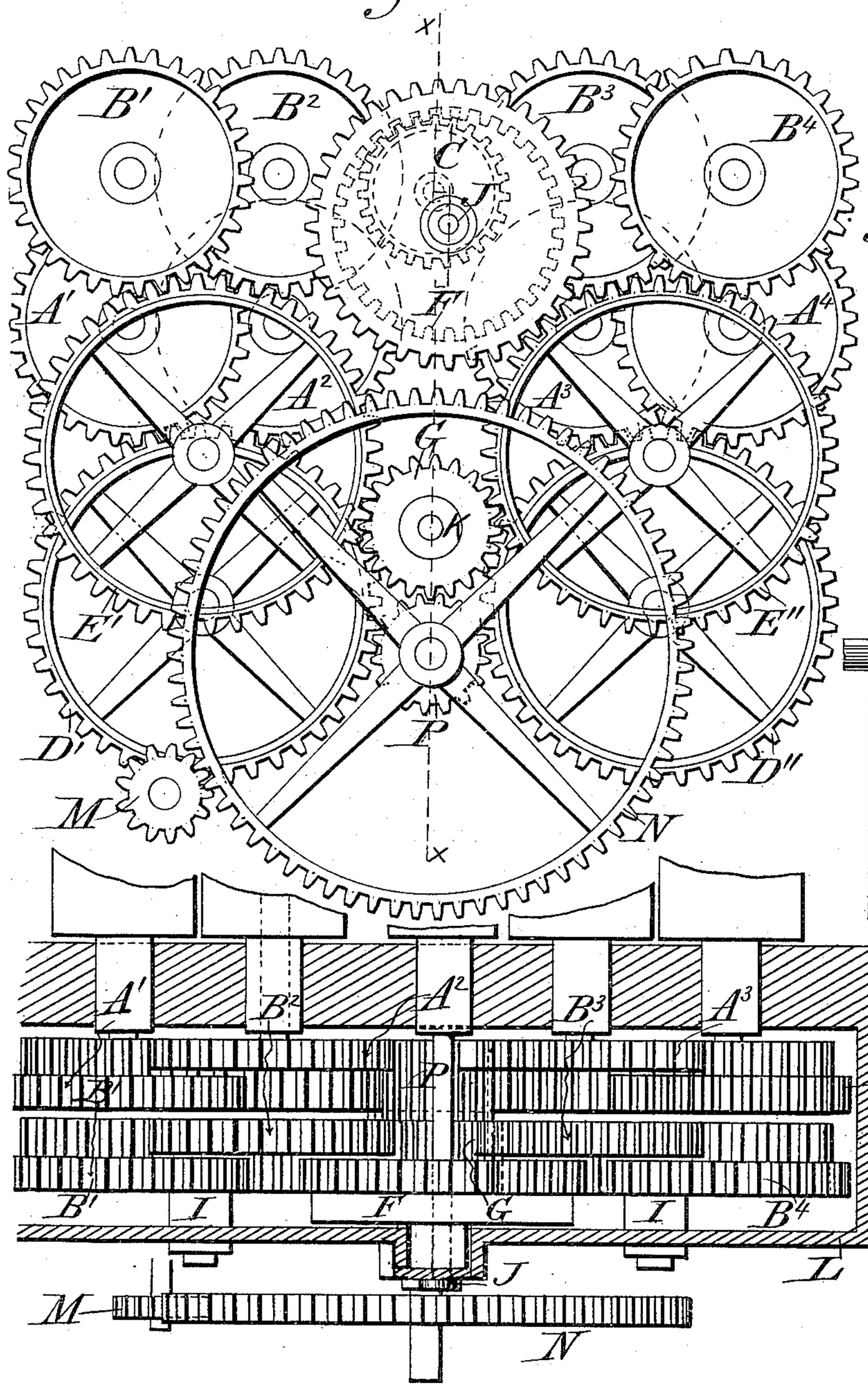

Fig. 2.

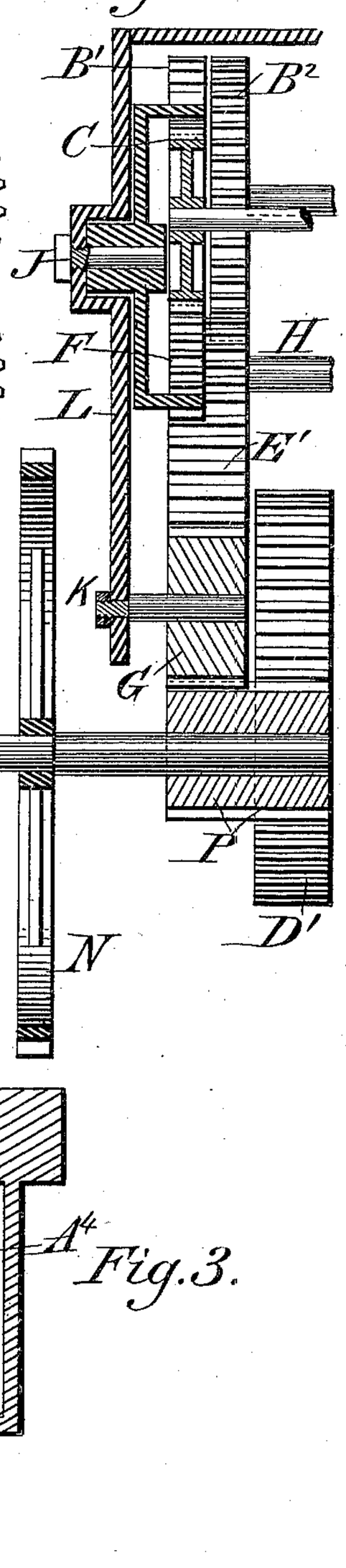

Fig. 3.

Witnesses
F. H. Schott
Fred E. Tasker.

Inventor
Baxter D. Whitney
By his Attorney John C. Tasker

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

UNITED STATES PATENT OFFICE.

BAXTER D. WHITNEY, OF WINCHENDON, MASSACHUSETTS.

GEARING.

SPECIFICATION forming part of Letters Patent No. 343,937, dated June 15, 1886.

Application filed January 30, 1886. Serial No. 190,298. (No model.)

To all whom it may concern:

Be it known that I, BAXTER D. WHITNEY, a citizen of the United States, residing at Winchendon, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Gearing; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to mechanism for transmitting motion and power from a single revolving shaft or wheel to a series of shafts or rolls—as used for feeding lumber or other material in machines for planing, jointing, matching, sawing, and other analogous purposes; and it consists of a system (or combination and arrangement) of gearing designed to operate a series of eight or nine rollers set in position to act on two sides of a board, plank, or other article to give it a rectilinear movement. These rollers are set in four pairs, one roller of each pair being placed directly over the other, and the ninth, when used, is located between the upper rolls of the two central pairs, so that five of the nine rollers from a line to contact with and act upon the upper surface of the board or other article carried by them, and the remaining four make another line for similar contact and action with the under side thereof; and to make the same applicable to articles of different thickness provision is made for a vertical adjustment of one line of said rollers, as will more fully appear in the following description, and from the drawings, making a part of this specification, in which a system of gear-wheels for operating nine feeding-rollers as applied to a machine for planing or smoothing lumber are represented as they would be arranged for use upon such machine.

Figure 1 is a side view of the gear-wheels as attached to the side of a machine, and shows a general plan of the system. Fig. 2 is a transverse vertical section on line *x x* of Fig. 1. Fig. 3 is a top view showing the alignment and connection of the principal parts with the frame of the machine, a portion of which is shown.

Similar reference-letters are used for like parts in all figures.

As represented by the drawings, the lower line of rollers and the gears of their train are designed for the vertical adjustment; but it may be applied to the upper line as well by slight modifications, without material change of the general plan or character of the system.

To enable others skilled in the art to make and use my invention, I will describe it.

Beginning with the rollers to be driven, as shown in Fig. 3, each of which has one gear attached to its shaft, it will be seen that those gears belonging to the four rollers of the lower line are designated A' A^2 A^3 A^4, while those of the upper rolls of the four pairs are indicated by B' B^2 B^3 B^4. These gear-wheels are all of similar form and size, being of such thickness or breadth of face as may be deemed suitable or of good proportions for their work, and of such diameter as may be admissible, which, to obtain a maximum leverage, may be as nearly twice the diameter of the roller as practicable without interference with the shafts of adjacent rollers, and to apply them of greater diameter than that of the rolls they are aligned so that A' and A^4 project beyond and lap by A^2 and A^3, while all of the gears of the upper line of rolls project beyond those of the lower line, to allow them to shut by whenever the rolls are brought in close position, and in similar manner the outer gears, B' and B^4, of the upper line set over and lap by B^2 and B^3. This leaves space between B' and B^4 for the gear C of the central roller, (or ninth of the series,) which likewise projects beyond and laps by B^2 and B^3 in line with B' and B^4. This makes four different sets or alignments of the nine gears, two of them being in a horizontal plane corresponding to the lower line of rollers, and the other two coincident to that of the upper rollers. Directly underneath the gears of the lower rollers are two intermediate or connecting gears, D' and D^2, which engage with a pinion-gear on the centrally-located shaft P, (the prime mover of the system,) from which they transmit motion to said lower line of rollers, D' engaging with and rotating A' and A^2, and D^2 engaging with and rotating A^3 and A^4, and directly underneath the upper roll-gears are two more intermediates, E' and E^2, which make similar connection with the upper line, E' serv-

ing to propel B′ and B², while E² actuates B³ and B⁴, and likewise through the intervention of an external and internal faced transmitting-wheel, F, it furnishes motive force for the gear C of the central roller, which provides for the movement of the entire upper line. The wheels E′ and E² are connected to their prime-mover pinion P by a small intermediate wheel, G, which serves to fill the space between them and reverses the motion, so that the upper roll-train revolves directly opposite to that of the lower roll, causing the contacting surfaces of the rollers to travel in the same direction. The four intermediates D′ and D² and E′ and E², are similar in form and character, each having sufficient breadth of face to correspond to and engage with the two rows of roll-gears of the respective trains. D′ D² of the adjustable train are mounted upon spindles H H, which are affixed to a part of the machine having a vertical movement corresponding to that of the lower line of rollers. They are also so proportioned and arranged with the "driving-gear" P, that a horizontal line through their axes will be central to the usual range of their vertical movement, so that such movement will not materially affect their engagement. E′ and E² are hung upon studs I I, projecting from a supplemental frame or plate, L, which extends around the gearing and attaches to the main frame of the machine. The wheel F, which transmits motion from E² to C, is supported by a pin, J, and the reversing intermediate gear, G, runs on post K, likewise set in plate L. The main driving-gear P, for working the two trains connected by D′ and D² in one line and G in the other, may be in two parts, affixed to a shaft to correspond with the respective trains; or it may be a single broad-faced pinion of sufficient width to engage with both lines and cover the space of the entire quadruple set of roll-gears, and it may be mounted and driven in any suitable manner. As represented in the drawings, it is on a shaft having another gear-wheel, N, which engages with a pinion, M, which in practice may be useful in the transmission of its motive power; but this last pair of gears is not essential to the subject-matter of the invention, as the system is complete without them; and starting from P as the single prime mover, the requisite motion is communicated to the entire series of rollers, as clearly shown by the foregoing description, while it forms a very compact, symmetrical, and efficient combination and arrangement of mechanism for the purposes for which it is especially designed and applicable.

As a noticeable and important feature of the plan of transmitting motion to yielding pressure and feed rollers as commonly employed on planing-machines, it may be observed that all its connections are made so that the side-thrust is in a horizontal direction, which avoids the tendency to lift or depress the rollers in a manner to disturb their normal action or pressure, as in machines where the moving force is exerted in a vertical direction, which is a common fault of many systems of roll-gearing now in use. The line of transmission from the prime mover to the eight principal rollers is also very direct, and by the shunted arrangement of the roll-gears their larger diameter diminishes the axle-strain and avoids consequent friction and wear, while the provisions for changing the position of the rollers by the arrangement of the large intermediate wheels with their driving-pinion, so that they move in a line of vertical tangents to their pitch-circles, affords sufficient range of adjustment without materially affecting their proper engagement.

In case it is desired to make the upper line of rollers adjustable, instead of the lower line, it may be effected by placing the driving-gear P between the wheels E E of the upper train, and setting the reversing-gear G directly under the driver to make connection with D D of the lower train, either modification being in accordance with the main design. Likewise, if more convenient or desirable, one train of wheels may be applied to drive the upper line of rollers at one side of the machine, while the other train of wheels to drive the lower line of rollers may be located at the other side of the machine, such application being in nowise inconsistent with the operation and purposes of the system, as the prime movers P would in that case be attached to the same shaft, which would simply be extended from one side of the machine to the other. It is also obvious that for purposes which may not require the use of the central upper roller, the gears F and C may be dispensed with without changing the system as designed for eight rolls, as that is complete in itself without them, and it is not material to the main system whether they are joined to it or not.

Having thus described the construction, application, and modifications of my improved system of gearing, I claim as my invention, and desire to secure by Letters Patent—

1. The combination of the four principal intermediate gears, D′, D², E′, and E², with the reversing-gear G, prime mover P, and eight roller-gears, A′ A² A³ A⁴ and B′ B² B³ B⁴, having short alignments, substantially as herein set forth and described.

2. The combination, with the four principal intermediate gears, D′ D² E′ E², the reversing-gear G, prime mover P, and eight roller-gears, A′ A² A³ A⁴ and B′ B² B³ B⁴, of the central roll gear, C, and its external and internal faced transmitting-wheel, F, all arranged and operating substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

BAXTER D. WHITNEY.

Witnesses:

FRED E. TASKER,

E. L. WHITE.