

No. 619,830.

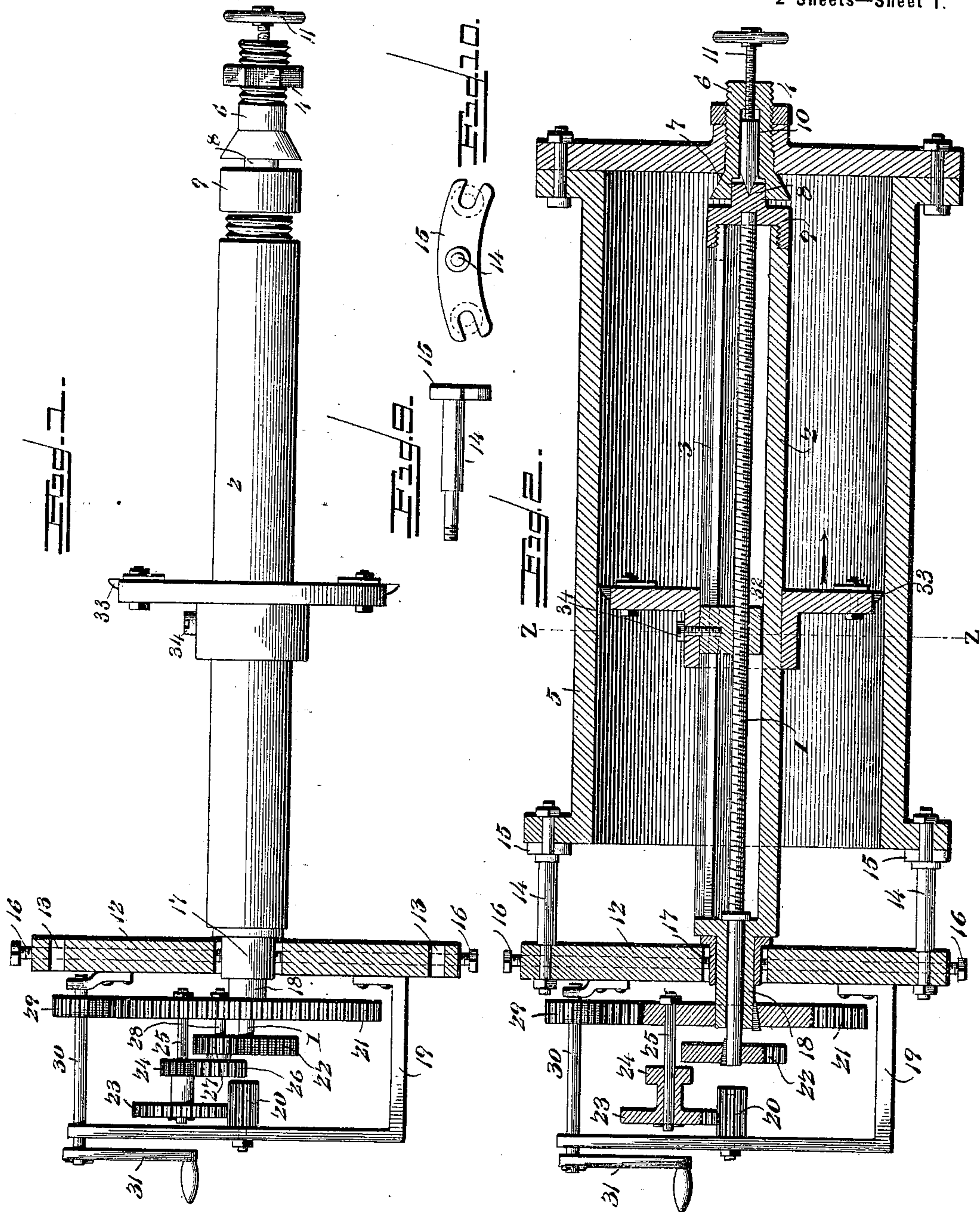
Patented Feb. 21, 1899.

G. W. MONTGOMERY.
CYLINDER BORING MACHINE.

(Application filed July 11, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
E. H. Stewart,
V. B. Fillyard.

George W. Montgomery, Inventor
By *W. D. S.* Attorneys.

C. A. Snow & Co.

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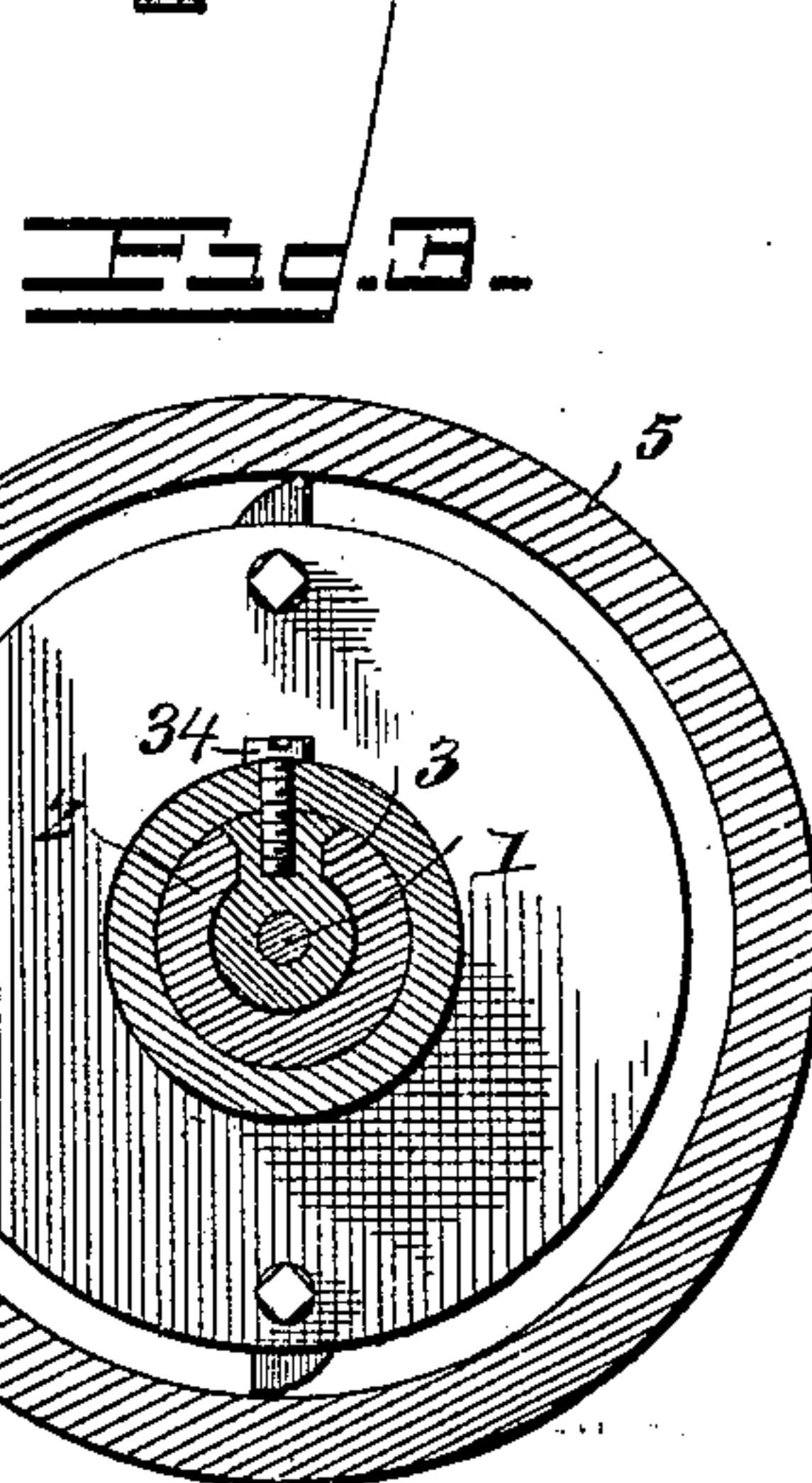
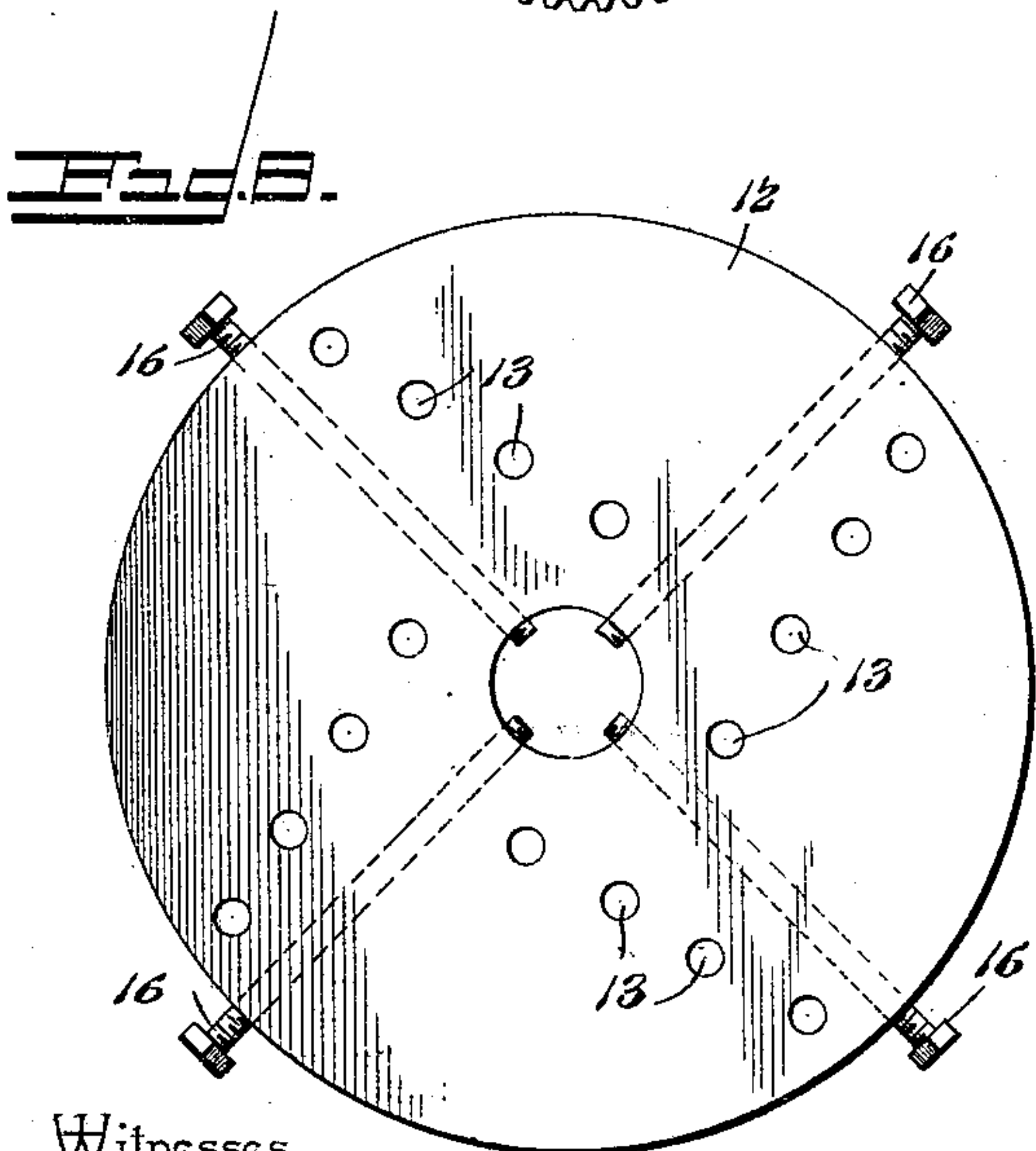
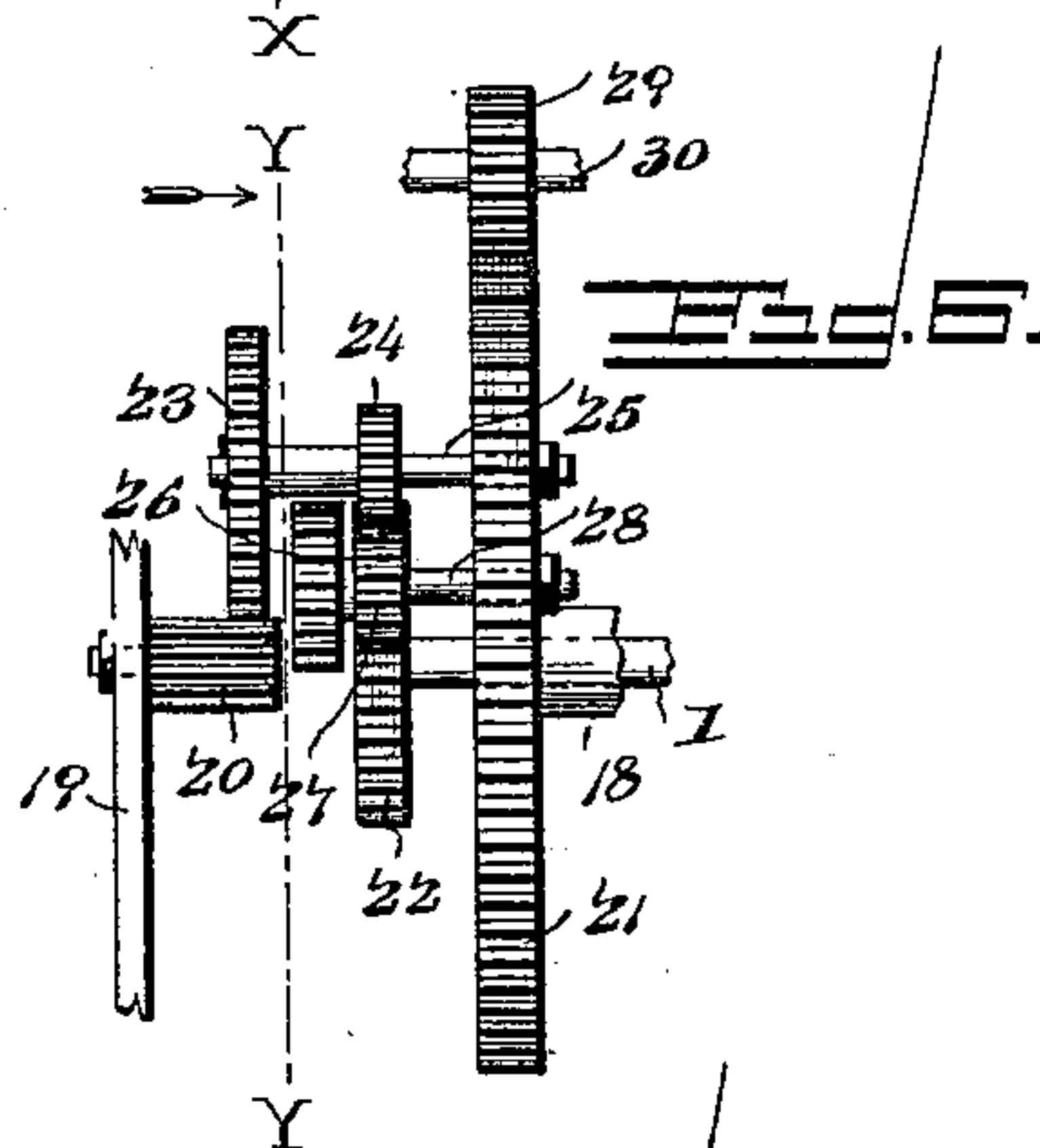
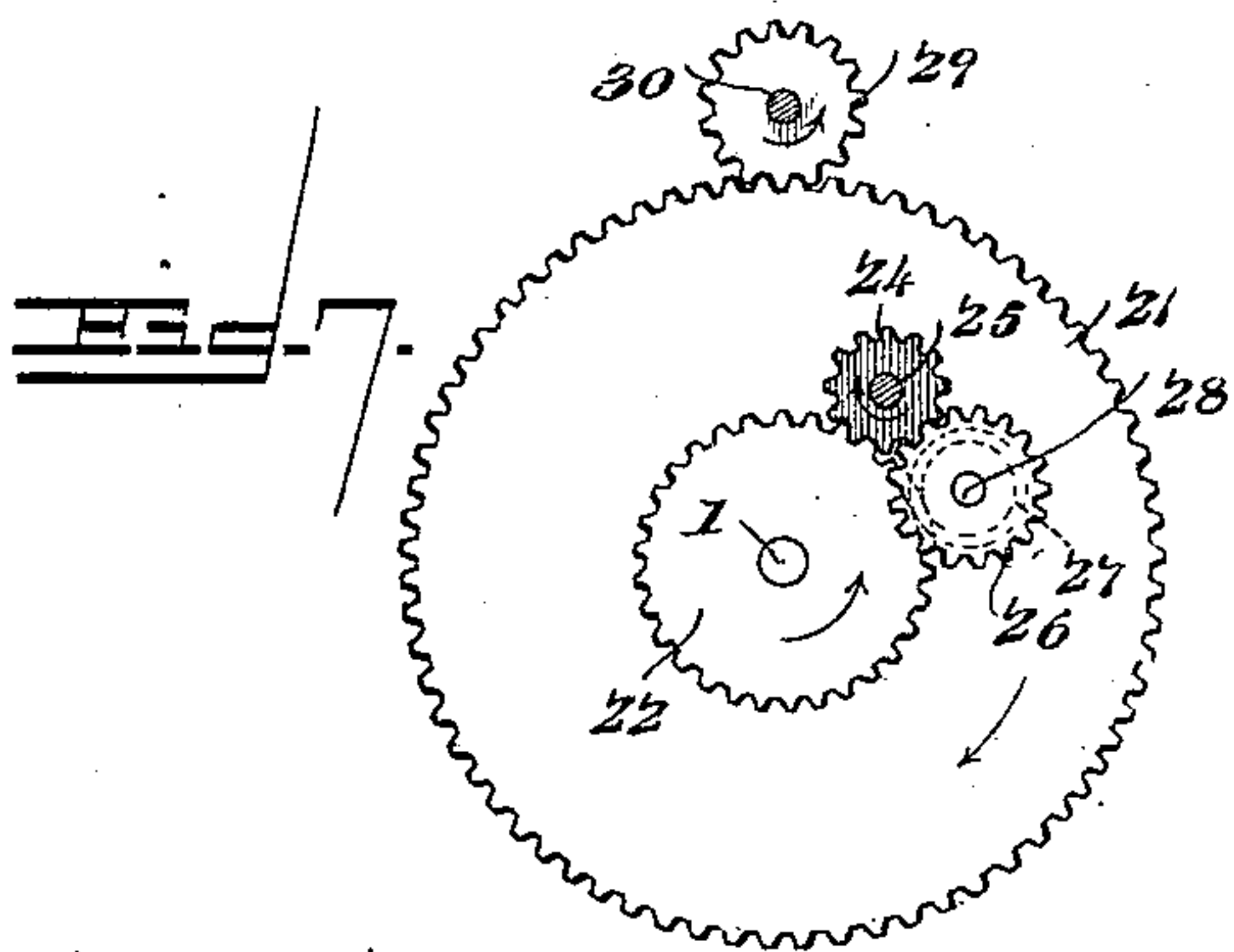
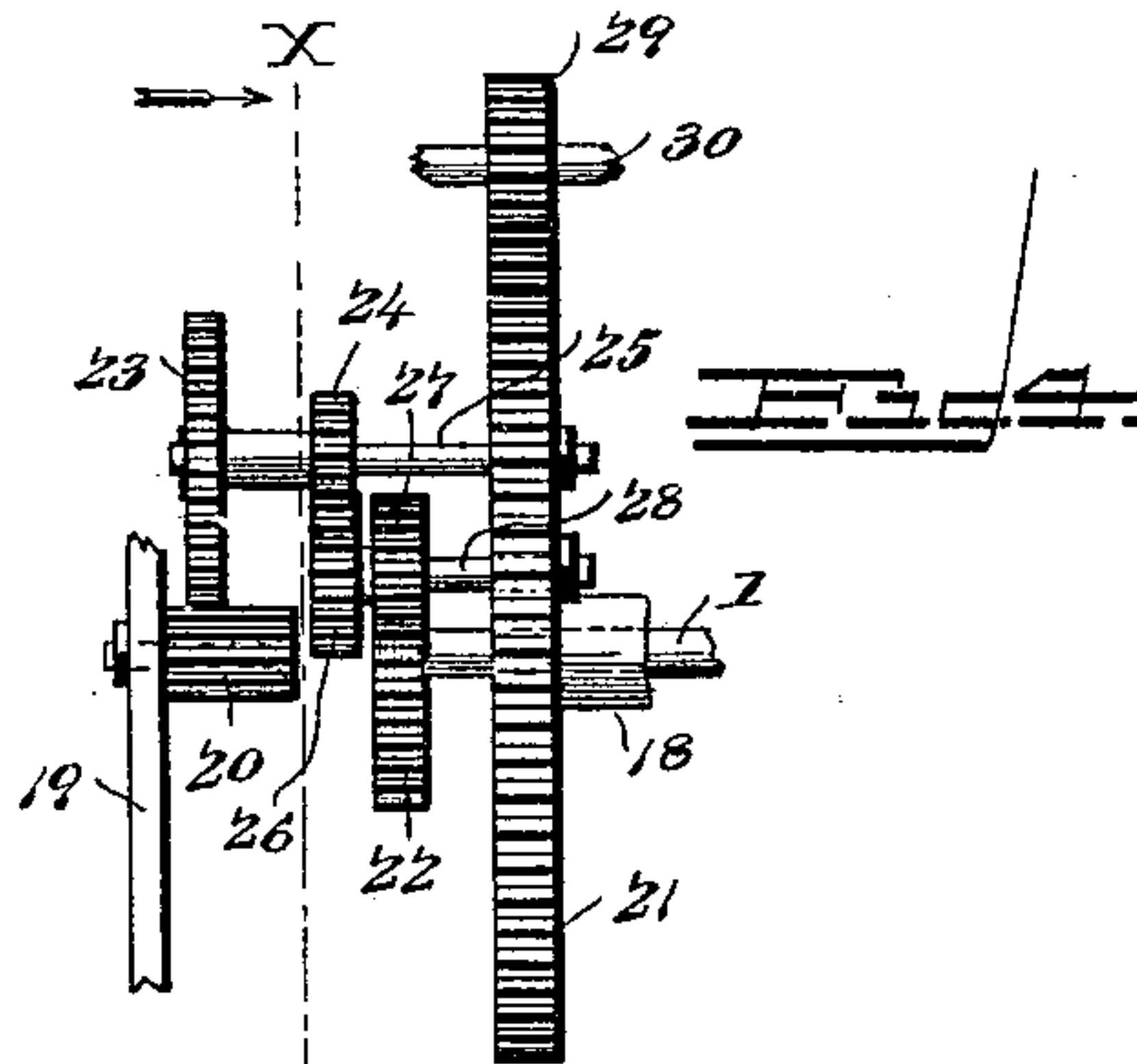
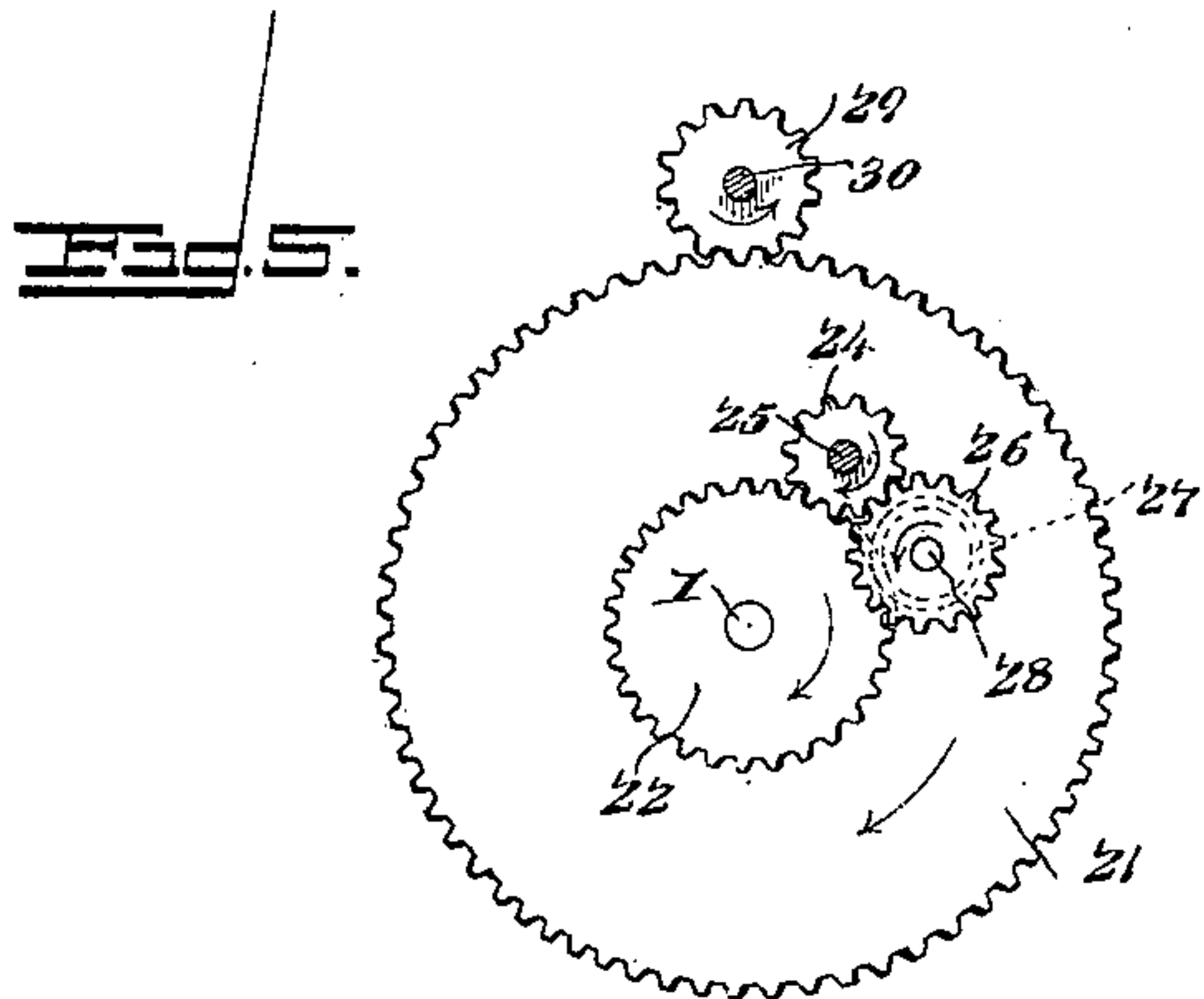
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2 Sheets—Sheet 2.



Witnesses
E. J. Stewart,
V. B. Hillyard.

George W. Montgomery, Inventor
By *W. D. S.* Attorneys.

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

GEORGE WASHINGTON MONTGOMERY, OF BELLAIRE, OHIO, ASSIGNOR OF
ONE-HALF TO FRANKLIN E. MCCOY, OF WHEELING, WEST VIRGINIA.

CYLINDER-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 619,830, dated February 21, 1899.

Application filed July 11, 1898. Serial No. 685,636. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON MONTGOMERY, a citizen of the United States, residing at Bellaire, in the county of Belmont and State of Ohio, have invented a new and useful Cylinder-Boring Machine, of which the following is a specification.

This invention has relation to apparatus for boring, truing, and finishing the cylinders of locomotives and engines of the type embracing reciprocating pistons.

The purpose of the invention is the provision of a boring mechanism which can be readily applied to any make or size of cylinder within certain limits and which will be of a portable nature, so as to obviate the necessity for the removal of the cylinder from its bed in order to apply it to a stationary boring mechanism as generally practiced.

The improvement resides more particularly in the instrumentalities whereby the apparatus is connected with the cylinder and in the actuating mechanism for rotating and feeding the boring-tool, whereby the latter can be advanced or withdrawn, as desired.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a detail view of a cylinder-boring apparatus constructed in accordance with this invention. Fig. 2 is a longitudinal section thereof, showing it applied to a cylinder. Fig. 3 is a transverse section on the line Z Z of Fig. 2. Fig. 4 is a side elevation showing the relation of the gearing when the boring-tool is advancing. Fig. 5 is a section of the gearing on the line X X of Fig. 4. Fig. 6 is a view similar to Fig. 4, showing the relation of the gearing when the boring-tool is moving backward to a starting position. Fig. 7 is a section of the gearing on the line Y Y of Fig. 6. Fig. 8 is a front view of the ring, which is se-

cured to the end of the cylinder to be bored and which has applied thereto the operating mechanism. Figs. 9 and 10 are detail views of one of the posts for connecting the ring to the cylinder.

Corresponding and like parts are referred to in the following description and indicated in the several views of the accompanying drawings by the same reference characters.

The boring apparatus comprises a feed-screw 1, a tubular shaft 2, inclosing the feed-screw and having a longitudinal slot 3 in its side, supports for the ends of the tubular shaft, and actuating mechanism for rotating the feed-screw and tubular shaft.

The support 4 for the outer end of the tubular shaft 2 may be a plate or disk and is adapted to be bolted to one end of the cylinder 5, and is centrally apertured to receive a plug 6, which is exteriorly threaded and screwed into the central opening of the support. This plug 6 is hollow, and its inner end is made flaring and is recessed, as shown at 7, to receive a journal 8, formed or applied to the outer end of a cap 9, which is fitted to the inner end of the tubular shaft 2. A pin 10 is slidably mounted within the plug 6, and its outer end is made conical to enter a conical depression in the outer end of the journal 8, thereby centering and forming a bearing for said journal. A set-screw 11 is mounted in the outer end of the plug 6 and is adapted to be turned up against the pin 10, so as to move the latter to insure a snug fit between said pin and the journal 8.

A ring or annular support 12 is adapted to be secured to the end of the cylinder 5 opposite the end to which the support 4 is fitted, and this ring has a series of openings 13 at different distances from the center, so as to admit of the support being applied to cylinders of different diameters. Posts 14, having cross-pieces 15 at their inner ends, are adapted to be bolted to the end of the cylinder 5 after its head has been removed, and their outer ends are reduced and adapted to pass through suitable openings 13. Set-screws 16 are let into threaded openings extending transversely through the ring 12 and are adapted to center and secure a bearing-sleeve

17, in which is journaled the outer reduced end 18 of the tubular shaft 2. A bracket 19 is secured to the support 12, and its outer end is provided with a pinion 20 in axial alinement with the feed-screw and tubular shaft.

The actuating mechanism for the feed-screw and tubular shaft consists of a gear-wheel 21, keyed to the journal 18 of the tubular shaft, a gear-wheel 22, secured to the outer end of the feed-screw, a combined gear-wheel and pinion 23 and 24, formed together or connected so as to rotate as one part and slidable upon a shaft 25, secured to the gear-wheel 21, and a double gear-wheel 26 and 27, mounted upon a shaft 28, secured to the gear-wheel 21. Any suitable means may be provided for rotating the gear-wheel 21, and, as shown, the pinion 29 is applied to a shaft 30 and is in mesh with the gear-wheel 21, said shaft being provided at its outer end with a crank 31, by means of which it is turned.

The feed-screw 1 is journaled at its outer end in the outer end portion of the tubular shaft 2 and is adapted to rotate independently of the tubular shaft. When the gear-wheel 21 is rotated, the shafts 25 and 28 move therewith in a circular path, and the gear-wheel 23, meshing with the pinion 20, is caused to rotate upon its shaft 25, and the pinion or toothed portion 24, being in mesh with the gear-wheel 22, rotates the feed-screw in one direction. If it be required to reverse the direction of rotation of the feed-screw, the combined or double gear-wheel 23 and 24 is shifted upon the shaft 25, so as to bring the pinion or toothed portion 24 out of mesh with the gear-wheel 22 and in mesh with the gear-wheel 26. The gear-wheel or toothed portion 27 is at all times in mesh with the gear-wheel 22, but serves to impart motion thereto only when the pinion 24 is in mesh with the toothed portion 26. The pinion 20 is sufficiently long so as to maintain a meshing relation with the gear-wheel 23 at both of its extreme movements. The gear-wheel 21 and the tubular shaft 2 are driven continuously in the same direction; but the feed-screw can be rotated so as to advance or return the boring-tool to a starting position by shifting the double gear-wheel 23 and 24 upon its shaft 25 in the manner set forth.

A feed-nut 32 is mounted upon the feed-screw 1 within the tubular shaft 2, and the boring-tool 33, of ordinary construction, is slidably mounted upon the tubular shaft 2 and has connection with the feed-nut 32 by means of a screw, pin, or like fastening 34, passing through the longitudinal slot 3 of the tubular shaft 2. In most cases it is not necessary to provide an extra support, as 4, inasmuch as the head of the cylinder through which the piston-rod operates may be utilized for this purpose. After the piston and piston-rod have been removed the stuffing-box through which the piston-rod works is disconnected from the head and the plug 6 is

fitted in the opening previously occupied by the stuffing-box and through which the piston-rod reciprocates. It will be understood that plugs of different sizes will be provided in order to enable the apparatus to be fitted to cylinder-heads having different-sized openings.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In an apparatus for boring engine-cylinders, the combination with a shaft provided with a boring-tool, actuating mechanism for rotating said shaft, and means for feeding the boring-tool, of a hollow plug fitted centrally to a support secured to an end of the cylinder, a cap applied to the inner end of the aforesaid shaft and provided with an outer reduced portion forming a journal having a conical depression in its outer end, said journal entering and obtaining a bearing in the recess formed in the inner end of the plug, a pin slidably mounted in the plug and having its outer end made conical to enter the conical depression of the aforesaid journal, and a set-screw applied to the outer end of the hollow plug and engaging at its inner end with the pin.

2. In boring apparatus for engine-cylinders, the combination with a shaft bearing a boring-tool, means for rotating the shaft, and a feeding mechanism for the boring-tool, of a ring having a series of openings at different distances from the center, posts provided at their inner ends with cross-pieces adapted to be bolted directly to the end of the cylinder to be bored and having their outer ends fitted into corresponding openings of the ring, set-screws located in threaded openings of the ring, and a bearing-sleeve receiving the outer end of the shaft and secured within the ring by means of the set-screws, substantially as specified.

3. In a portable apparatus for boring engine-cylinders, the combination with a shaft bearing a boring-tool, a feed-screw concentric with and journaled within the shaft, and gear-wheels secured to the shaft and feed-screw in concentric relation, of a pinion in axial alinement with the feed-screw and shaft and independent thereof, a shaft 25 secured eccentrically to the gear-wheel applied to the boring-tool shaft, a double gear slidably mounted upon the shaft 25 and having a member in mesh with said axial pinion, and means for connecting the other member of said double gear with the feed-screw gear, substantially as and for the purpose set forth.

4. In boring apparatus for engine-cylinders, the combination with a feed-screw and shaft having concentric relation, a boring-tool mounted upon the shaft and having connection with the feed-screw, and gear-wheels secured to the shaft and feed-screw in concentric relation, of a pinion in axial alinement with the feed-screw, a double gear-wheel having a toothed portion normally in mesh with

the gear-wheel of the feed-screw and jour-
naled to the gear-wheel applied to the shaft,
and a second double gear-wheel journaled to
the gear-wheel of the boring-shaft and hav-
5 ing a toothed portion in mesh with the afore-
said pinion at all times and adapted to have
its other toothed portion brought into mesh-
ing relation with either the gear-wheel of the
feed-screw or the toothed portion of the first-
10 mentioned double gear, according to the di-

rection in which it is required to rotate the
feed-screw substantially as set forth.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in
the presence of two witnesses.

GEORGE WASHINGTON MONTGOMERY.

Witnesses:

FRANKLIN E. MCCOY,
LOUIS FEINLER.