

No. 736,726.

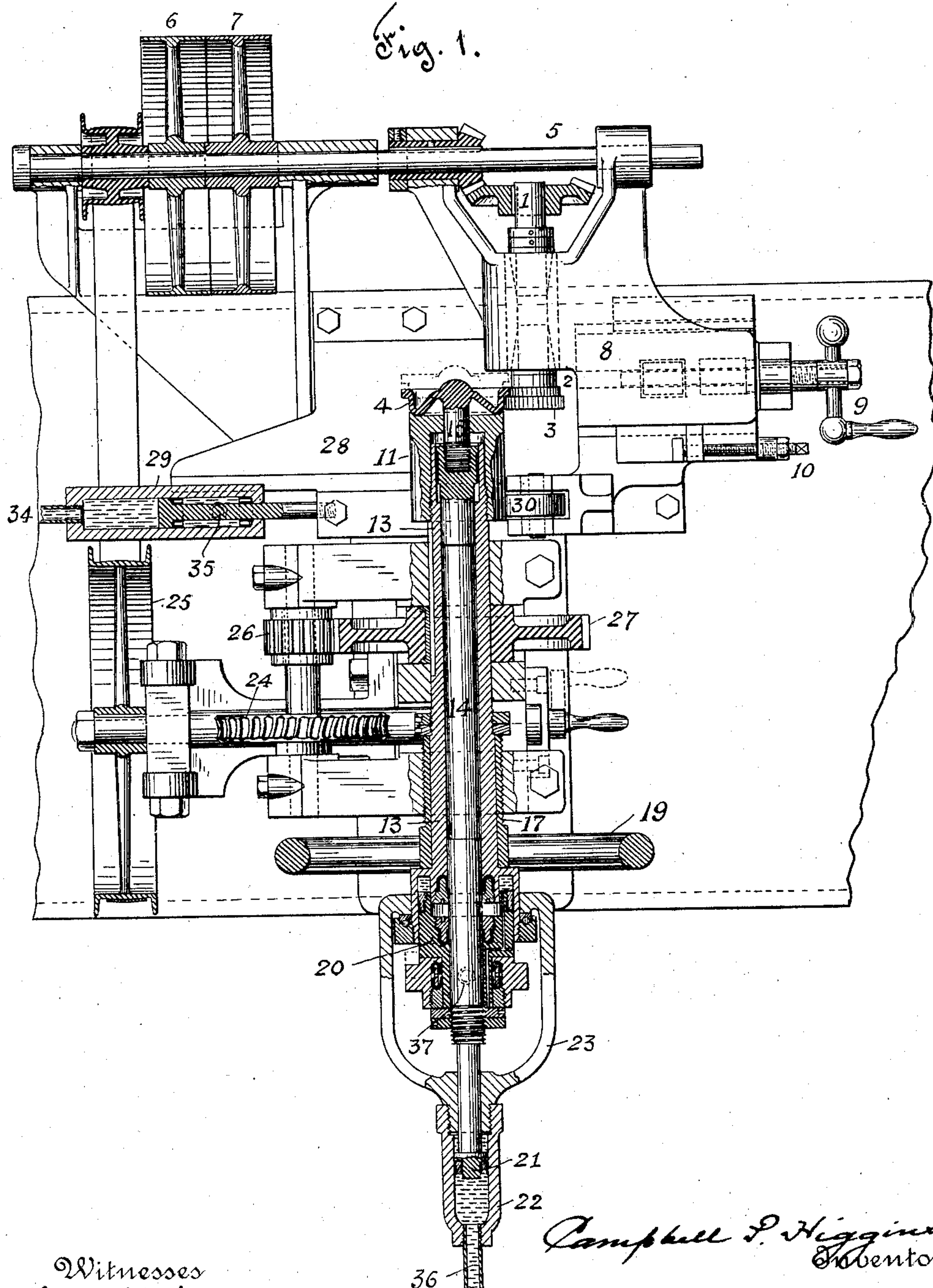
PATENTED AUG. 18, 1903.

C. P. HIGGINS.
MILLING MACHINE.

APPLICATION FILED DEC. 17, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
Charles Kanimann
Samuel L. Sargent

Campbell P. Higgins
Inventor
By *his* Attorney
Thas W. Forbes

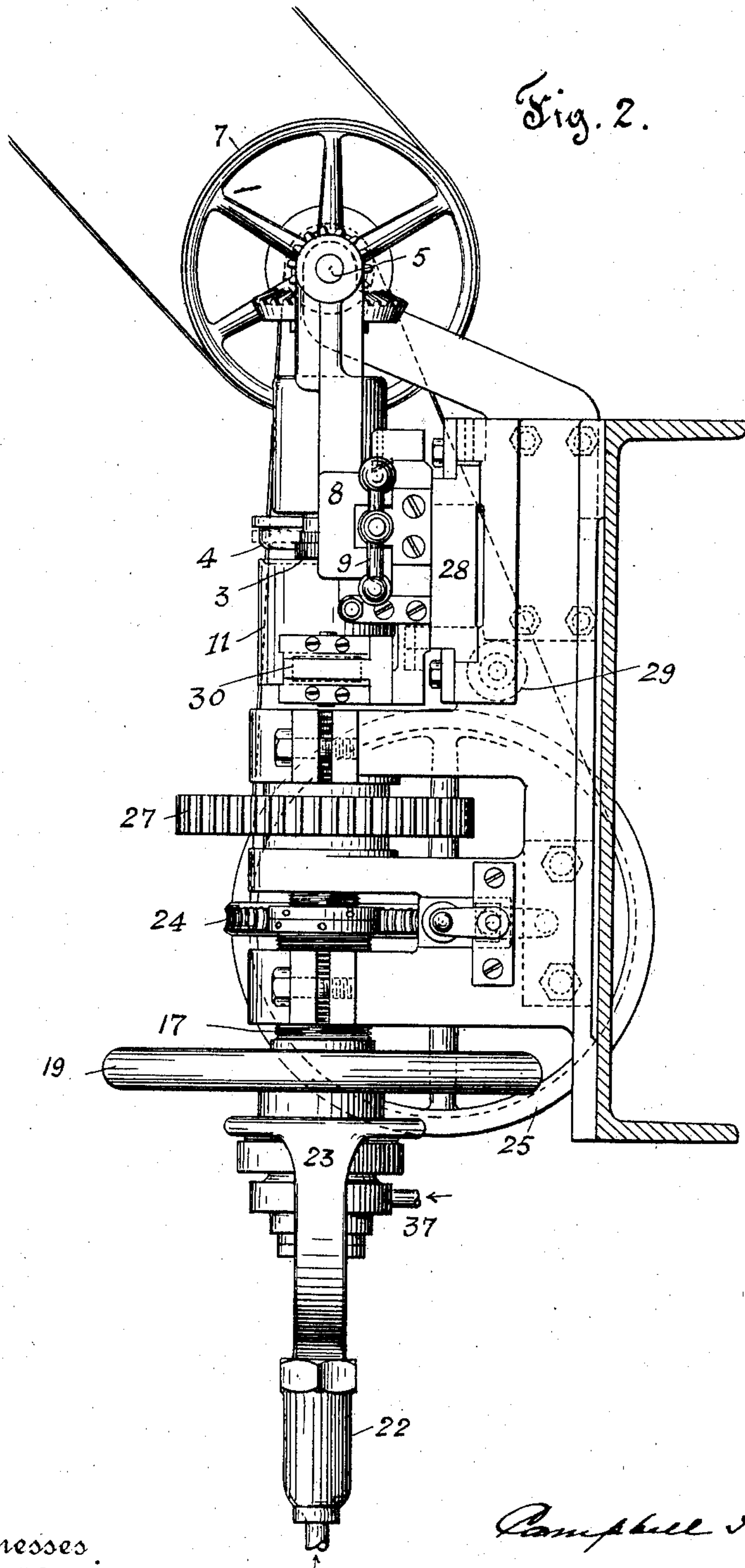
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3 SHEETS—SHEET 2.



Witnesses.
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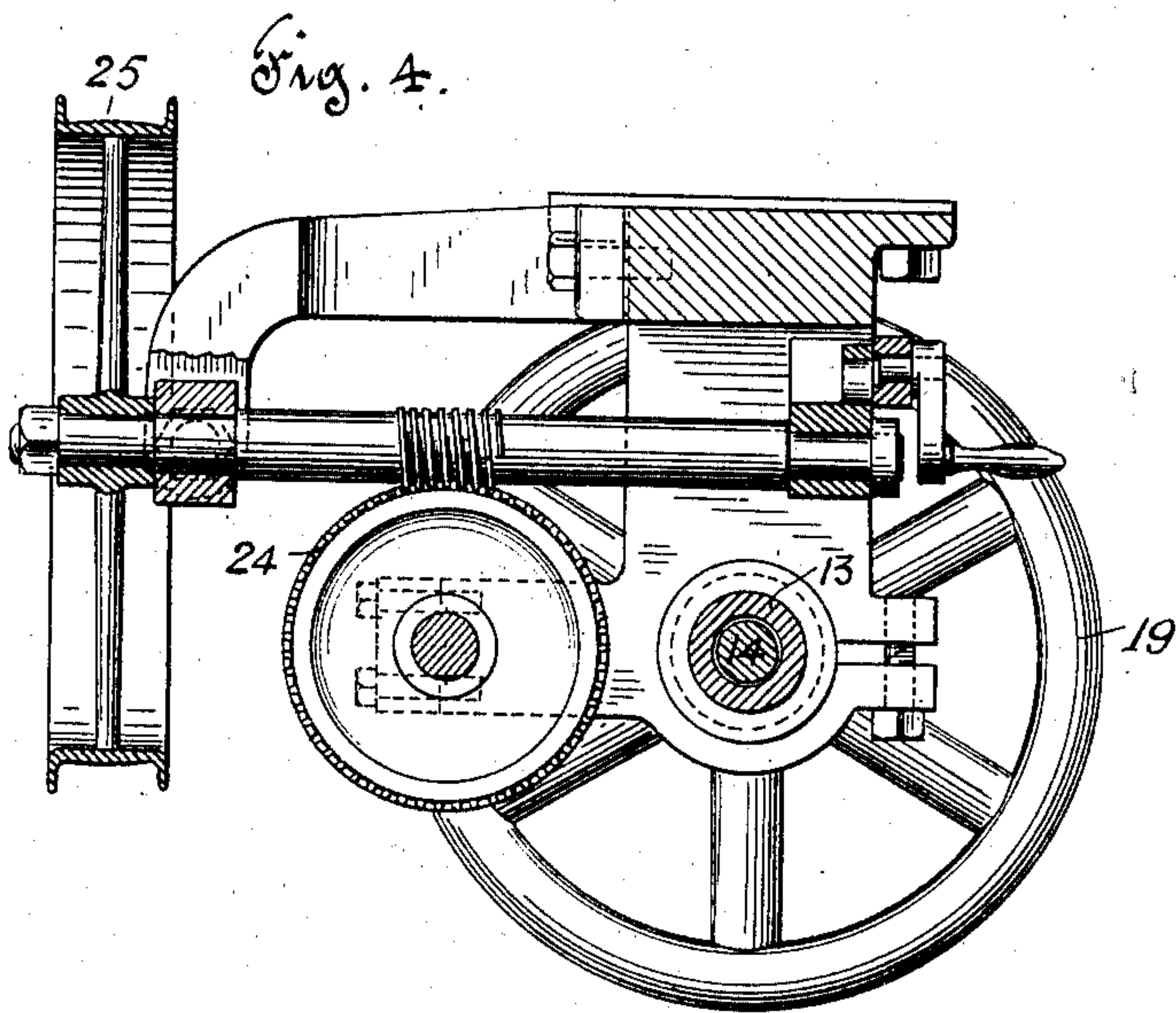
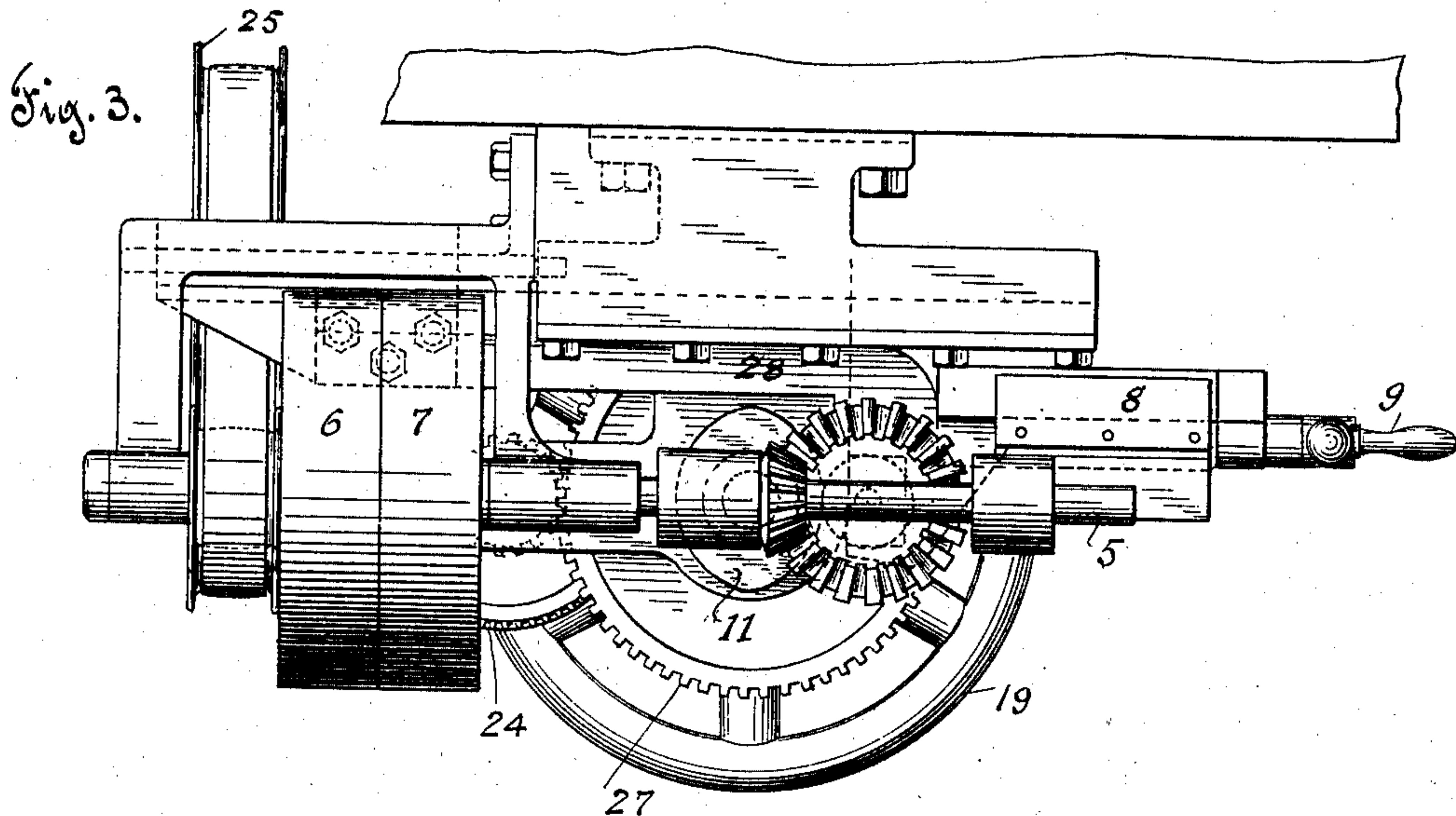
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3 SHEETS—SHEET 3.



Witnesses
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Samuel L. Sargent

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UNITED STATES PATENT OFFICE.

CAMPBELL P. HIGGINS, OF ROSELLE, NEW JERSEY.

MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 736,726, dated August 18, 1903.

Application filed December 17, 1902. Serial No. 135,604. (No model.)

To all whom it may concern:

Be it known that I, CAMPBELL P. HIGGINS, a citizen of the United States; and a resident of Roselle, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Metal-Milling Machines, of which the following is a specification.

This invention relates to a machine for milling the circumferential flanges and seats of hand-hole plates for steam-generators or other uses; and it consists in means for adjusting and operating the plate to be milled and the application of hydraulic-pressure devices for holding the milling-tool in contact with the plate and moving the holder longitudinally, as hereinafter fully described.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation, partly in section; Fig. 2, a side elevation; Fig. 3, a top plan view of a machine embodying the invention, and Fig. 4 a cross-sectional view through the shaft that revolves the plate-holder.

The machine in organization comprises a vertical revolving holder for the plate and a carriage movable transversely thereto carrying the milling-tool. The milling-tool is attached to an arbor or spindle 1 and its operating-face stepped (2 3) to act simultaneously upon the edge and flanged seat of the hand-hole plate 4, as shown in operative position in Fig. 1. The milling-tool spindle 1 is revolved through the medium of the connected bevel-gears and power-shaft 5 and driving belt-pulley 6, a loose shifting pulley 7 being provided to stop the machine in the usual way.

The depth of the cut of the milling-tool is regulated by its carriage 8, which is operated by a threaded rod, with hand-wheel 9 connected therewith, the movement being limited by a stop-screw 10.

The head 11 for holding the plate 4 to be operated upon is connected to a hollow feed-spindle 13, having a rod 14, to which the plate is connected by its threaded stud-bolt 15, the lower end of the rod 14 being connected with a hydraulic cylinder 20.

The vertical position of the plate 4 to be operated upon relatively with the action of the milling-tool is effected by means of a threaded collar 17, connected to a sleeve 13,

upon which the head 11 for holding the plate is fixed, the threaded collar being adjusted by the hand-wheel 19 and engaging with the adjacent framework of the machine.

The rod 14 is extended beyond the cylinder 20 and provided with a piston 21, operating within an auxiliary hydraulic cylinder 22, which is suspended by a yoke-frame 23. (Shown in Figs. 1 and 2.)

The object of the auxiliary hydraulic cylinder 22 is to lift the rod 14 and raise the plate 4 clear of the milling-tool when the work is completed, as shown in dotted lines, Fig. 1.

The feed motion for rotating the hollow spindle 13, which carries the head 11 and plate 4, is derived from the worm-shaft 24, operated by the belt-pulley 25 and connected spur-gears 26 27.

The carriage 28, carrying the carriage 8, with the milling-tool and spindle 1 and roller 30, is held against the head 11 by the hydraulic cylinder 29, the roller 30 upon the carriage forming the contact with the head.

The head 11 is in this instance oval in cross-section to correspond to the circumferential shape of the plate 4, as shown in the plan view, Fig. 3.

The operation of the machine is as follows: Hydraulic pressure, which is derived from any suitable source, is applied to the outer end of cylinder 29, moving the carriage 28 back and carrying the milling-tool 2 3 away from the work. The pressure in cylinder 20 is then exhausted, which allows the pressure in the auxiliary cylinder 22 (which is constant) to raise the rod 14, carrying the plate 4 to its highest position. The stud-bolt 15 of the plate is then screwed into the rod 14, and the plate is turned in such position that its outline conforms to the oblong holding-head 11. Pressure is then applied to cylinder 20, which draws the rod 14 downwardly and which holds the plate firmly upon the head 11. The pressure in the outer end of the cylinder 29 is now released and the opposite pressure at the inner end draws the carriage 28 and its roller 30 in contact with the head 11. The milling-tool is now brought into operation by the manipulation of its feed device, and the machine is allowed to run until the spindle 13, carrying the head 11 and plate 4, has made

a complete revolution. In again applying pressure to the outer end of the cylinder 29 the carriage 28 and its roller 30 are moved away from the head 11, the pressure-cylinder 5 20 released, and the rod 14 rises by the constant pressure in cylinder 22, and the plate is then removed. The pressure is admitted and released to and from the respective cylinders 29, 22, and 20 through the pipe connections 10 34 35 36 37, the extensions of which are provided with suitable valves for the purpose. (Not shown.)

Having thus fully described my invention, what I claim, and desire to secure by Letters 15 Patent, is—

In a machine for milling the edge of an article of any circumferential form, the combi-

nation of a revolving holder of corresponding form in cross-section, and a rotating milling-tool mounted upon a carriage having a lateral 20 movement with means for holding, rotating, and adjusting the article to be milled and hydraulic-pressure devices for holding the milling-tool in contact with the article, and hydraulic-pressure devices for moving the holder 25 longitudinally to and from said milling device, as set forth.

Signed at Bayonne, in the county of Hudson and State of New Jersey, this 26th day of November, A. D. 1902.

CAMPBELL P. HIGGINS.

Witnesses:

JAMES A. MCNAMARA,
H. S. CHINNOCK, Jr.