

No. 608,195.

Patented Aug. 2, 1898.

G. GUILD.  
HYDRAULIC SHEARING MACHINE.

(No Model.)

(Application filed Dec. 4, 1897.)

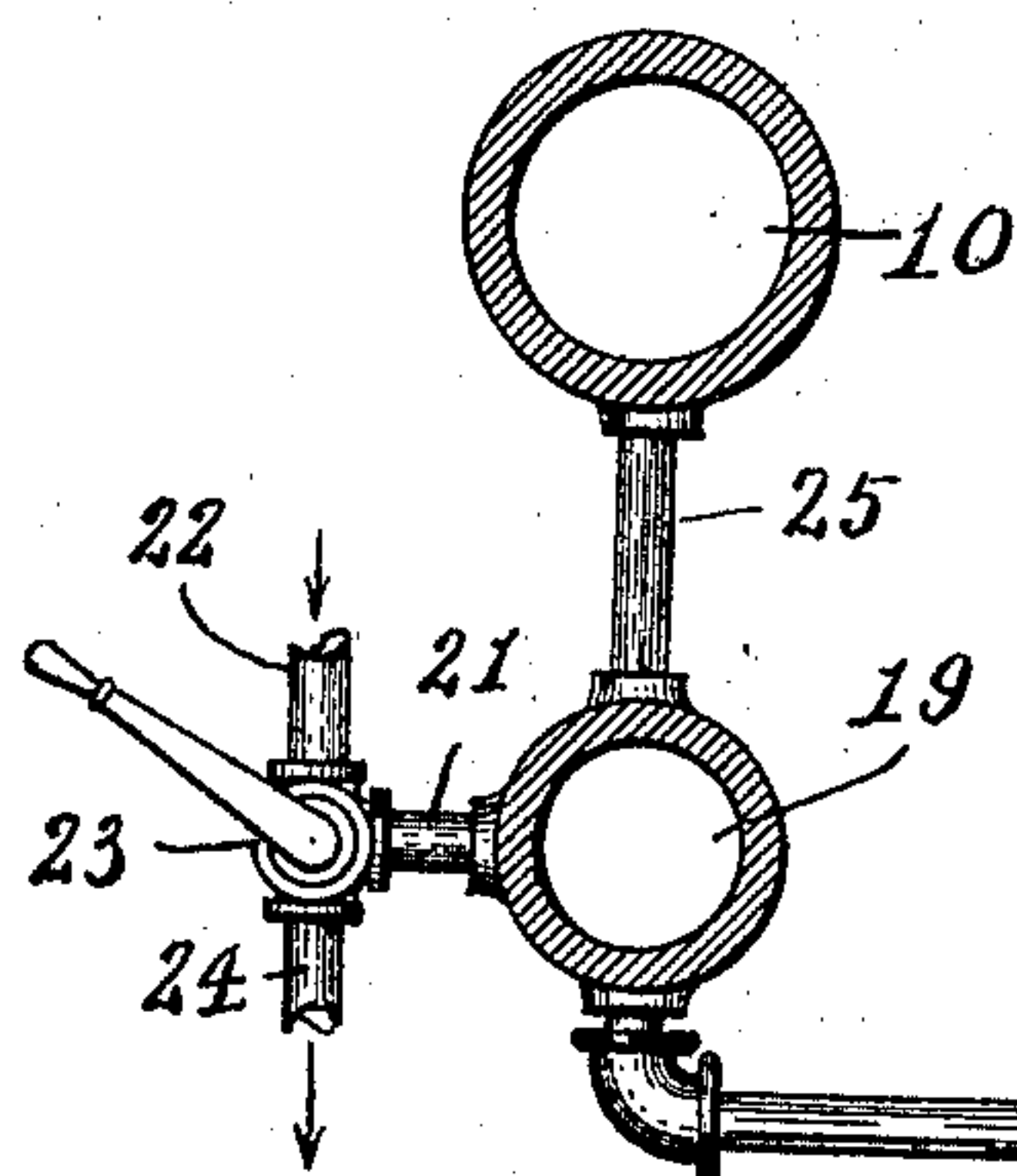
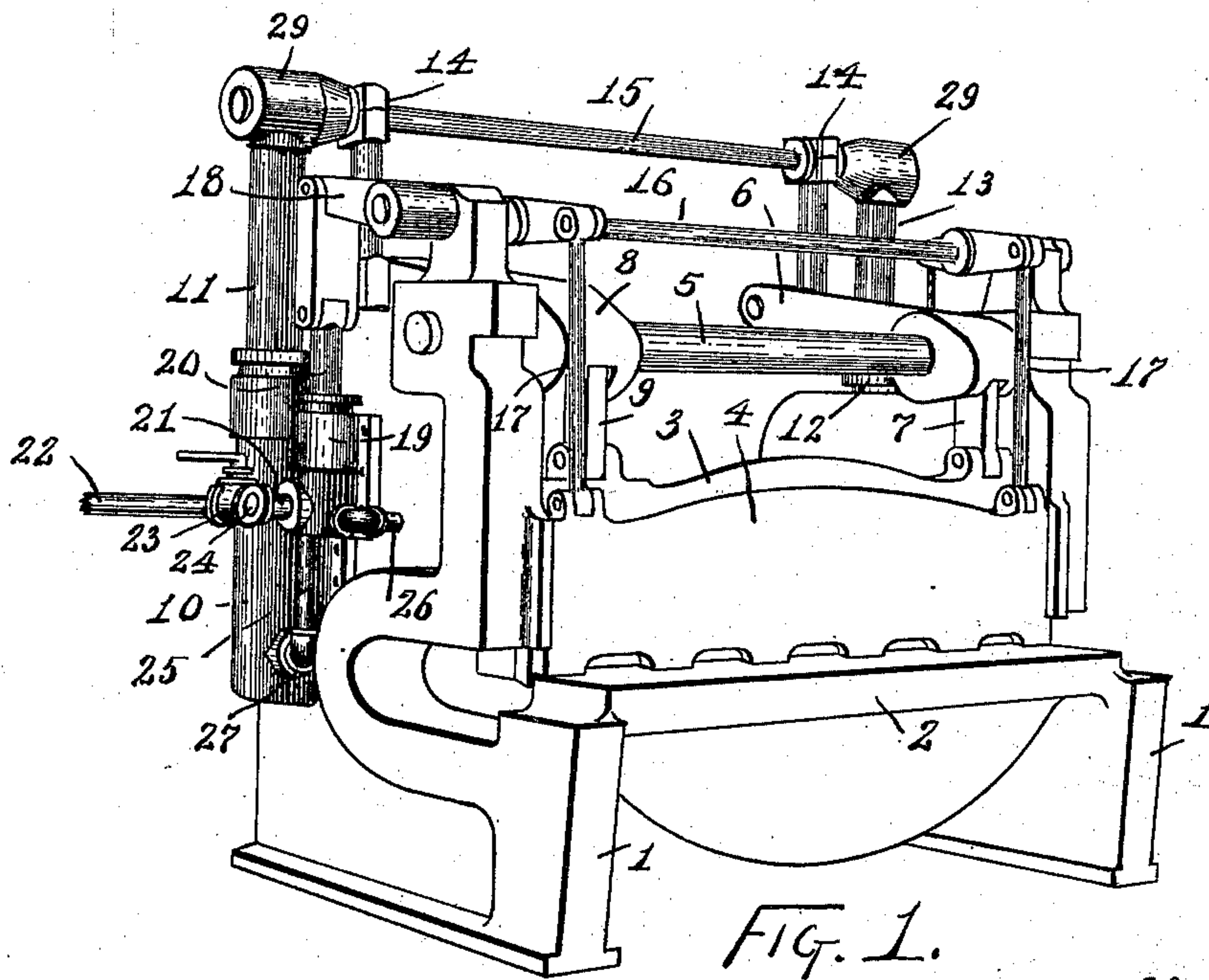


FIG. 2.

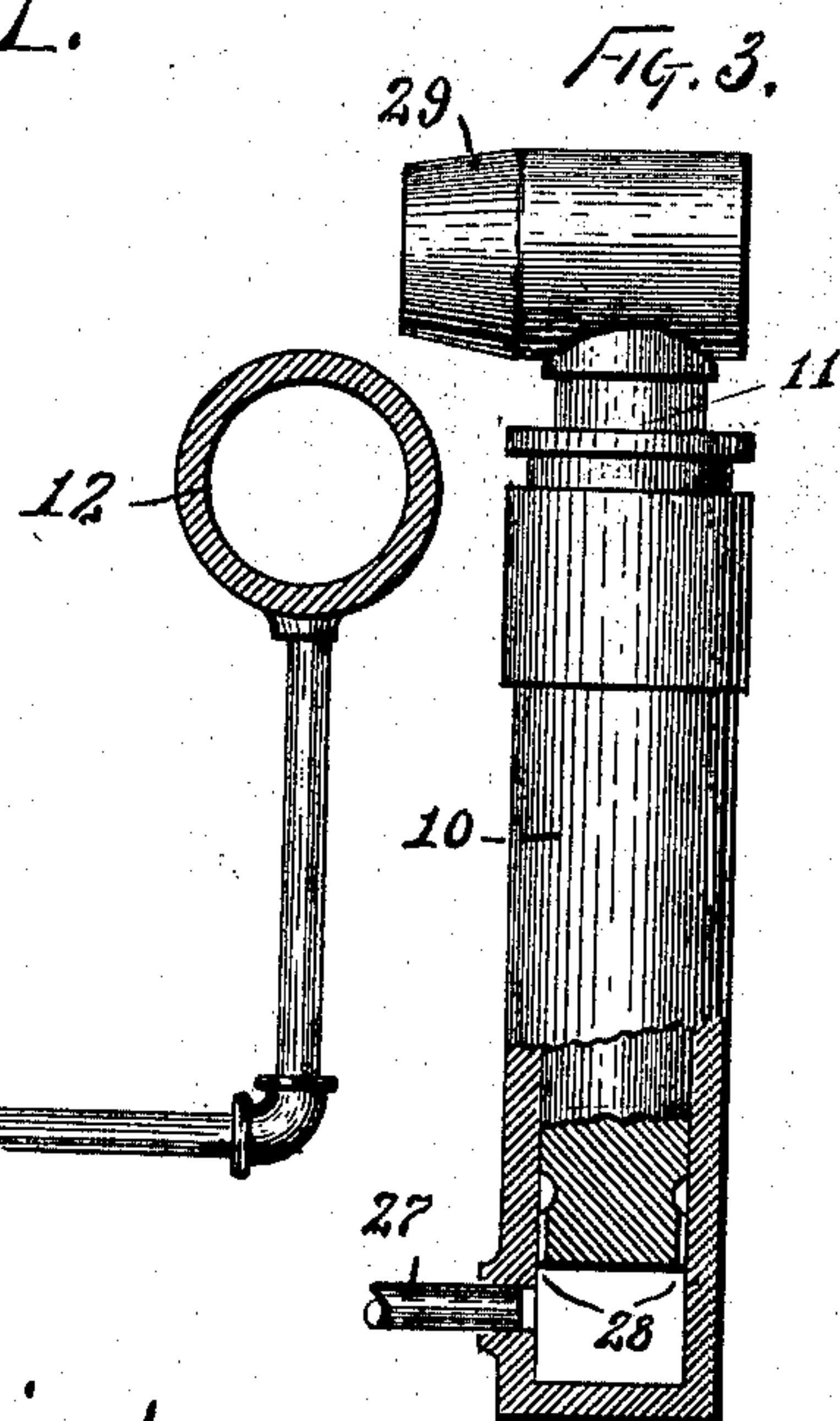


FIG. 3.

Witnesses:  
*E. Shipley*  
*M. S. Belden*

*George Guild*  
by *James W. See*

Inventor  
Attorney



# UNITED STATES PATENT OFFICE.

GEORGE GUILD, OF CAMBRIDGE CITY, INDIANA, ASSIGNOR TO BERTSCH & CO., OF SAME PLACE.

## HYDRAULIC SHEARING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 608,195, dated August 2, 1898.

Application filed December 4, 1897. Serial No. 660,754. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE GUILD, of Cambridge City, Wayne county, Indiana, have invented certain new and useful Improvements in Hydraulic Shearing-Machines, of which the following is a specification.

This invention pertains to improvements in hydraulic shearing-machines; and the improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a hydraulic shearing-machine embodying my improvements; Fig. 2, a sectional plan of the cylinders and water connections thereof; and Fig. 3, a side elevation, part vertical section, of one of the power-cylinders.

In the drawings, 1 indicates the housings, of usual throated type; 2, the table, carrying the lower shear-blade, as usual; 3, the vertically-sliding gate, carrying the upper shear-blade, as usual; 4, the holddown-gate, sliding vertically in front of the shear-gate 3 and serving to press the sheet down to the table while being sheared; 5, a rock-shaft journaled in the housings over and somewhat to the rear of the shear-gate and parallel with the plane of the gate; 6, a power-lever on shaft 5 just within one of the housings, this lever having a rearwardly-projecting arm and having also an arm projecting forwardly over the shear-gate; 7, a link connecting the forward arm power-lever 6 with the shear-gate; 8, a second power-lever similar to lever 6, but disposed against the inner surface of the opposite housing, this lever having also forwardly and rearwardly projecting arms; 9, a link connecting the forward end of power-lever 8 with the shear-gate; 10, a power-cylinder secured against the outer surface of one of the housings at the rear of the housing; 11, the ram of this cylinder, the same projecting upwardly from the cylinder through a suitable stuffing-box; 12, a second power-cylinder similar to cylinder 10, but secured against the outer surface of the opposite housing of the machine; 13, the ram of this second power-cylinder; 14, links extending downward from cross-heads on the upper ends of rams 11 and 13 into pivotal connection with the rear arms of power-levers 6 and 8; 15, a long wrist-bar ex-

tending across from ram 11 to ram 13 and rigidly uniting their cross-heads and serving as the wrist for both of links 14; 16, a rock-shaft journaled in the housings over rock-shaft 15 and hereinafter termed the "holddown rock-shaft," this holddown rock-shaft being provided near each end with forwardly-projecting arms; 17, links extending downward from the just-mentioned arms to hold-down-gate 4; 18, an arm fast upon holddown rock-shaft 16 and extending rearwardly; 19, a hydraulic cylinder, hereinafter termed the "holddown-cylinder," secured against one of the housings under the rear end of arm 18; 20, the ram of the holddown-cylinder, the same projecting upwardly from the cylinder and being connected by a link with the rear end of arm 18; 21, inlet water-pipe to holddown-cylinder 19; 22, water-supply pipe connected with pipe 21 and leading from any suitable source of supply of water under pressure; 23, a three-way valve disposed between pipes 21 and 22; 24, exhaust-pipe connected with valve 23, so that by means of the valve pipe 21 can be placed in communication either with the supply-pipe 22 or the exhaust-pipe 24; 25, a pipe leading from holddown-cylinder 19 to power-cylinder 10; 26, a pipe leading from holddown-cylinder 19 to power-cylinder 12; 27, admission-point into the power-cylinders from pipes 25 and 26, the same being at the base of the power-cylinders and adapted to be overrun by the arms of the power-cylinders as the rams approach the lower ends of their strokes; 28, grooves in the periphery of the lower ends of the rams of the power-cylinders, the same extending from the lower end of the ram up to such height as to still be in communication with inlet-point 27 when the power-arms are in their lowermost positions, and 29 the cross-heads on the upper ends of the power-rams.

When water under pressure is admitted under power-rams 11 and 13, the rams are forced up and pull upon links 14 and rock power-levers 6 and 8 and cause the forcible descent of shear-gate 3. Continuous wrist-bar 15 serves in equalizing the power applied to the two ends of the shear-gate. The resistance offered to the descent of the shear-gate is liable to be excessive at one end or



the other, and the long wrist is useful in transmitting the effect of either power-cylinder, or of both if two power-cylinders are employed, to each end of the gate.

5 Water admitted under power-ram 20 causes the rocking of shaft 16 and a downward action of holddown-gate 4. The supply of water first goes to the holddown-cylinder 19 through pipe 21 and goes from that cylinder 10 to the two power-cylinders, the pressure thus reaching the holddown-cylinder first and causing the holddown-gate to go promptly into action and to anticipate the descent of the shear-gate, and when, after the completion of the cutting stroke, the water is exhausted the holddown mechanism first feels the effect of the relief.

When the three-way valve is opened to the exhaust and the pressure thus relieved, the 20 power-rams begin to slowly descend, the water in the power-cylinders passing out through liberal openings formed at admission-points 27. Toward the end of the downstroke the speed of descent of the rams becomes accelerated and the rams are liable to knock the 25 bottoms of their cylinders or to arrest the motions of the parts controlled by them with undesired suddenness; but in the present construction, as illustrated in Fig. 3, toward 30 the end of the downstroke of the power-rams the outlet-openings from the power-cylinders become gradually closed by the downward overrunning of the lower ends of the power-rams until finally the openings are completely overrun, grooves 28, however, continuing to keep the discharge-openings in restricted communication with the cylinder-spaces below the power-rams, so that the final exhaust and consequent speed of descent of 40 the rams is comparatively mild; and when the water is admitted to lift the rams it finds admission to the cylinders through grooves 28, the admission being sufficiently liberal to start the rams and give to the shear-gate its 45 initial motion preparatory to begin the cutting.

I claim as my invention—

1. In a hydraulic shearing-machine, the combination, substantially as set forth, with 50 housings, a shear-gate, and a rock-shaft journaled in the housings over the shear-gate, of power-levers on the rock-shaft and having forwardly and rearwardly extending arms, connections between the forward arms of said 55 power-levers and the shear-gate, a wrist-bar

linked to the rear arms of both said power-levers, and a power-cylinder having its bar connected with one end of said wrist-bar.

2. In a hydraulic shearing-machine, the combination, substantially as set forth, with 60 housings, a shear-gate, and a rock-shaft journaled in the housings over the shear-gate, of power-levers on the rock-shaft and having forwardly and rearwardly extending arms, connections between the forward arms of said 65 power-levers and the shear-gate, a wrist-bar linked to the rear arms of both said power-levers, and a pair of power-cylinders each having an arm connected with one end of said wrist-bar. 70

3. In a hydraulic shearing-machine, the combination, substantially as set forth, with housings, a shear-gate, and a holddown-gate, of a holddown-cylinder having its ram mechanically connected with said holddown- 75 gate, a power-cylinder having its ram mechanically connected with said shear-gate, a pipe leading from said holddown-cylinder to said power-cylinder, and a supply-pipe and exhaust-pipe connected with said holddown- 80 cylinder whereby the water operating the power-cylinder must enter and exhaust through the holddown-cylinder.

4. In a hydraulic shearing-machine, the combination, substantially as set forth, with 85 housings, a shear-gate, and a holddown-gate, of a holddown-cylinder having its ram mechanically connected with said holddown-gate, a pair of power-cylinders having their rams mechanically connected with said shear-gate, 90 pipes leading from said holddown-cylinder to each of said power-cylinders, and a supply-pipe and exhaust-pipe connected with said holddown-cylinder, whereby the water operating both said power-cylinders must enter 95 and exhaust through the holddown-cylinder.

5. In a hydraulic shearing-machine, the combination, substantially as set forth, with housings, a shear-gate and a power-cylinder having an inlet-opening near its base, of a 100 ram working in said power-cylinder and mechanically connected with said shear-gate and having its lower end arranged to overrun said inlet-opening and having longitudinal grooves at its lower end.

GEORGE GUILD.

Witnesses:

LYNN E. KEPLER,  
OSCAR E. HOWARD.