

No. 729,430.

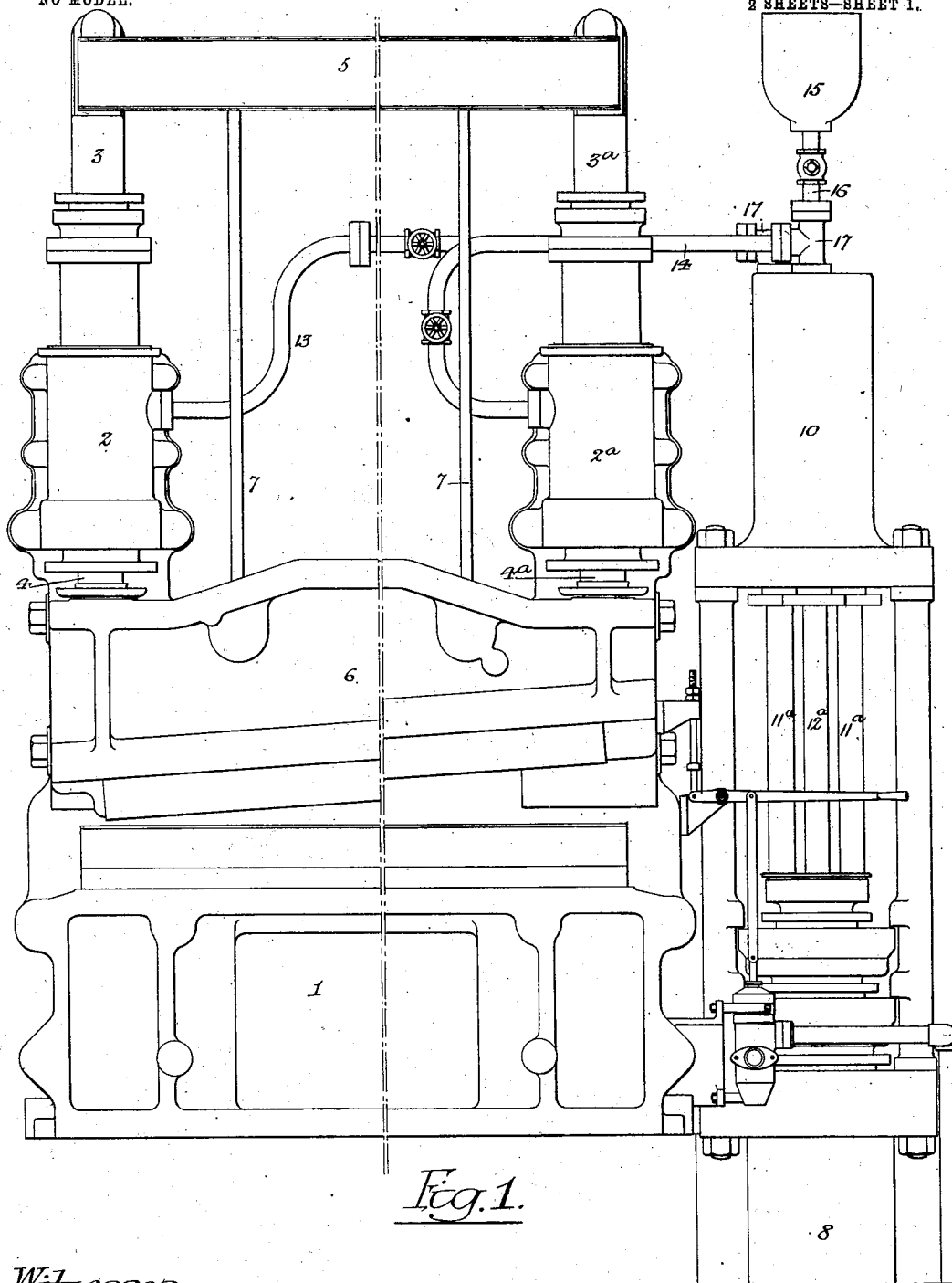
PATENTED MAY 26, 1903.

G. W. SHEM.
HYDRAULIC SHEARING MACHINE.

APPLICATION FILED NOV. 12, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:-

Norman E. Mettius
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Inventor:-

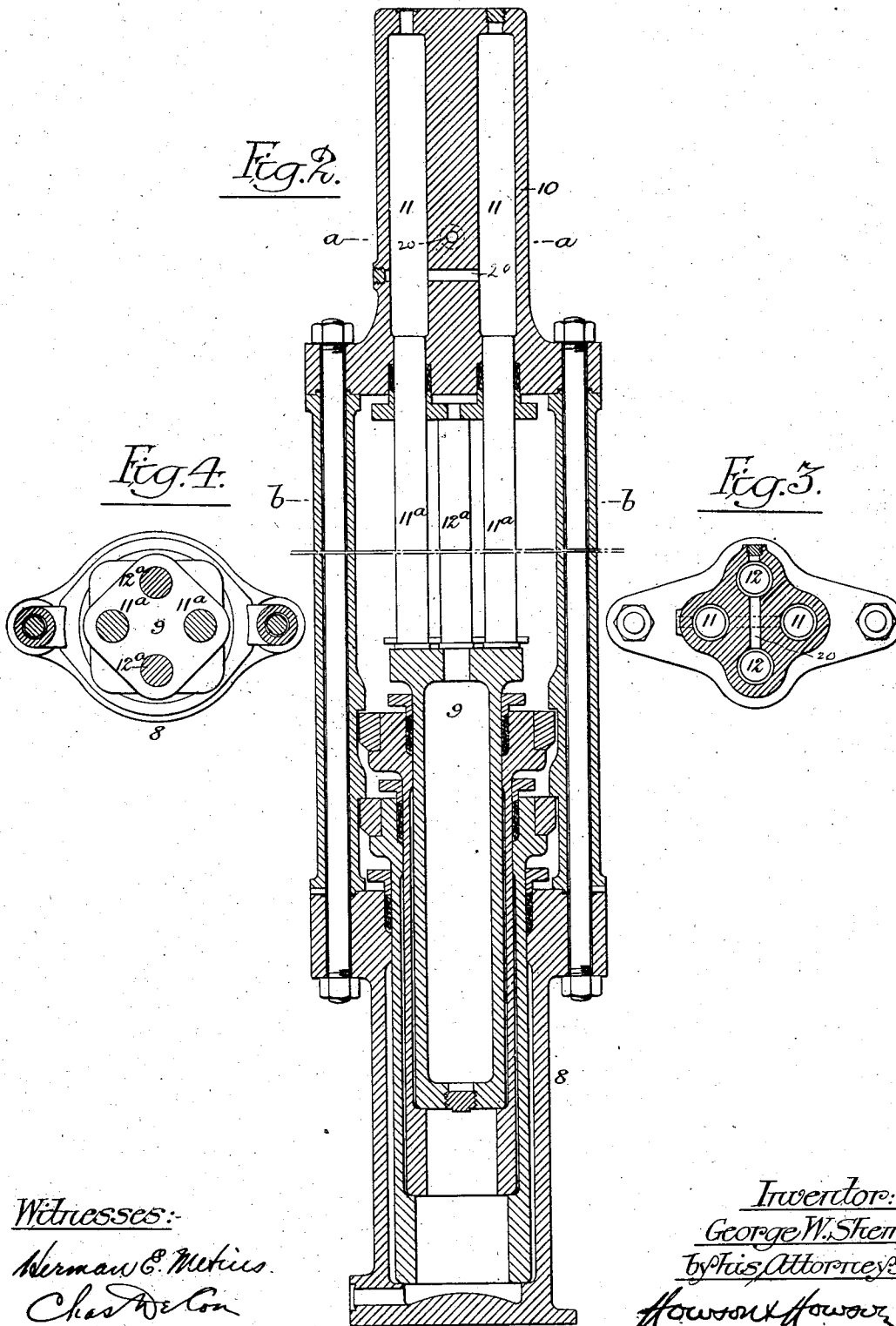
George W. Shem,
by his Attorneys
Howard & Howard

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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

GEORGE W. SHEM, OF ALLIANCE, OHIO, ASSIGNOR TO CAMDEN IRON WORKS,
OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HYDRAULIC SHEARING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 729,430, dated May 26, 1903.

Application filed November 12, 1902. Serial No. 131,061. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. SHEM, a citizen of the United States, residing at Alliance, Ohio, have invented certain Improvements in Hydraulic Shearing-Machines, of which the following is a specification.

The object of my invention is to so construct a hydraulic shearing-machine as to insure the uniform movement of the shearing-blade in a parallel plane during the cutting operation, the invention being especially applicable to that class of machines in which the shearing-blade is inclined in respect to the plane of the work.

In the accompanying drawings, Figure 1 is a front view of sufficient of a hydraulic shearing-machine to illustrate my invention. Fig. 2 is a vertical section, on an enlarged scale, of that portion of the machine to which my invention particularly relates. Fig. 3 is a sectional plan view on the line *a a*, Fig. 2; and Fig. 4 is a sectional plan view on the line *b b*, Fig. 2.

Referring first to Fig. 1 of the drawings, 1 represents the base portion of the machine, upon which are suitably mounted hydraulic cylinders 2 2^a, having upwardly-projecting rams or plungers 3 and 3^a and downwardly-projecting rams or plungers 4 and 4^a. The upwardly-projecting rams carry the cross-head 5, from which the shearing-blade 6 is suspended by means of rods 7, said shearing-blade being also acted upon directly by the downwardly-projecting plungers 4, so that as said plungers are reciprocated vertically corresponding vertical movement will be imparted to the shear-blade. When the shear-blade is inclined in respect to the plane of the work, as shown, so as to act upon the latter with the desired shear cut, and two cylinders are employed, one at each end of the blade, there will, if both cylinders have the same source of supply, be a tendency of the blade to straighten when its advancing end comes in contact with the work, owing to the fact that its advancing end thus meets with pressure, while there is no pressure upon the opposite end of the blade. Hence there is a tendency of the plunger in the cylinder 2^a to continue its movement while the move-

ment of the plunger in the cylinder 2 is arrested. In order to overcome this objection, I provide the cylinders with independent pressure-supplies and so regulate the latter that each of the plungers is compelled to have uniform movement, whereby the shearing-blade is maintained in the same plane from the beginning to the end of its travel. The pressure is derived from an accumulator or intensifier 8, which may be of any suitable character, that shown in the present instance being similar to the one for which I obtained Letters Patent No. 584,712, dated June 15, 1897, the primary plunger of such intensifier being represented at 9. Mounted upon the frame of the intensifier 8 is a multiple cylinder 10, having in the present instance four bores 11 11 and 12 12, connected in pairs by means of transverse passages 20, the bores 11 receiving plungers 11^a and the bores 12 receiving plungers 12^a, all of which plungers are secured to and move with the primary plunger 9 of the intensifier. The pair of cylinders 11 communicate, through a pipe 13, with the cylinder 2 of the shearing-machine, and the pair of cylinders 12 communicate, through a pipe 14, with the cylinder 2^a. Hence when the plunger 9 of the intensifier is projected water will be forced into each of the cylinders 2 2^a in precisely equal volumes, and the plungers in said cylinders will consequently be caused to move to the same extent and at uniform speed. A reservoir 15 above the cylinder structure 10 communicates, through valved pipes 16, with the couplings 17, whereby the pipes 13 and 14 are connected to said cylinder structure 10, the purpose of this reservoir being to supply to the cylinder and pipe connections water in quantity sufficient to compensate for any loss due to leakage or any cause, so that the cylinders, pipes, and other connections may at all operative times be kept completely filled. This is effected by opening the valves in the pipes 16 at suitable intervals.

Single cylinders 11 and 12 and single plungers 11^a and 12^a may, if desired, be used instead of the pairs of communicating cylinders and the double plungers shown and described; but by the use of cylinders in connected pairs

the number of plungers is increased and the bearing of the same upon the plunger 9 is more evenly distributed.

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

1. The combination in a shearing-machine, of the shear-blade and a pair of cylinders for operating the same, with means for supplying motive fluid independently but in like volume to each cylinder, substantially as specified.

2. The combination in a shearing-machine, of the shear-blade, a pair of cylinders for operating the same, a pressure-exerting device, and a multiple-cylinder structure having plungers connected to said pressure device, one cylinder or set of cylinders being connected to one of the operating-cylinders of the machine and the other cylinder or set of cylinders being connected to the other of said operating-cylinders, substantially as specified.

3. The combination in a shearing-machine, of the shear-blade a pair of cylinders for operating the same, a pressure-exerting device,

and a multiple-cylinder structure having cylinders in connected pairs, and plungers therefor connected to the pressure device, one pair of cylinders being connected to one of the operating-cylinders of the machine, and the other pair to the other of said operating-cylinders, substantially as specified.

4. The combination in a shearing-machine, of the shear-blade, a pair of cylinders for operating the same, a pressure device, a multiple-cylinder structure operated thereby for supplying motive fluid to the operating-cylinders, and a reservoir having a valved connection with said cylinder structure for supplying liquid thereto to compensate for waste or leakage, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE W. SHEM.

Witnesses:

R. S. KIRK,

G. W. YANNEY.