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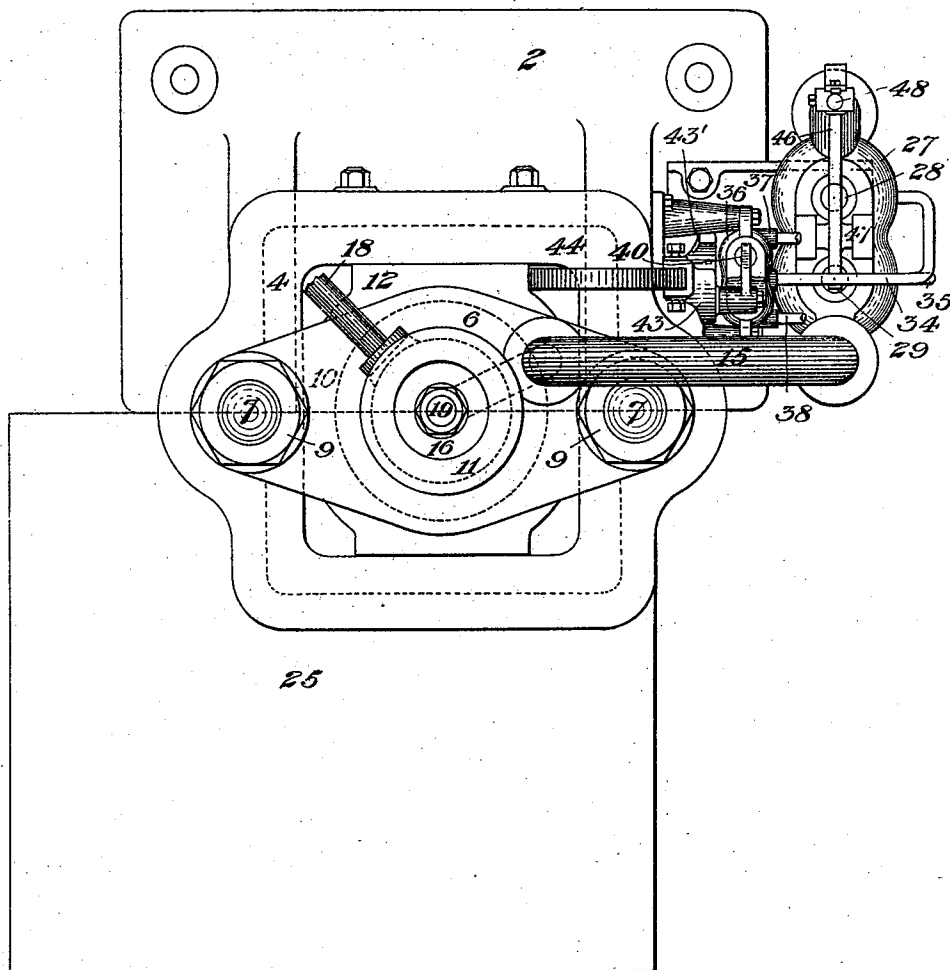
4 Sheets—Sheet 1.

H. AIKEN.
SHEARS.

No. 545,759.

Patented Sept. 3, 1895.

Figure 1.



Witnesses

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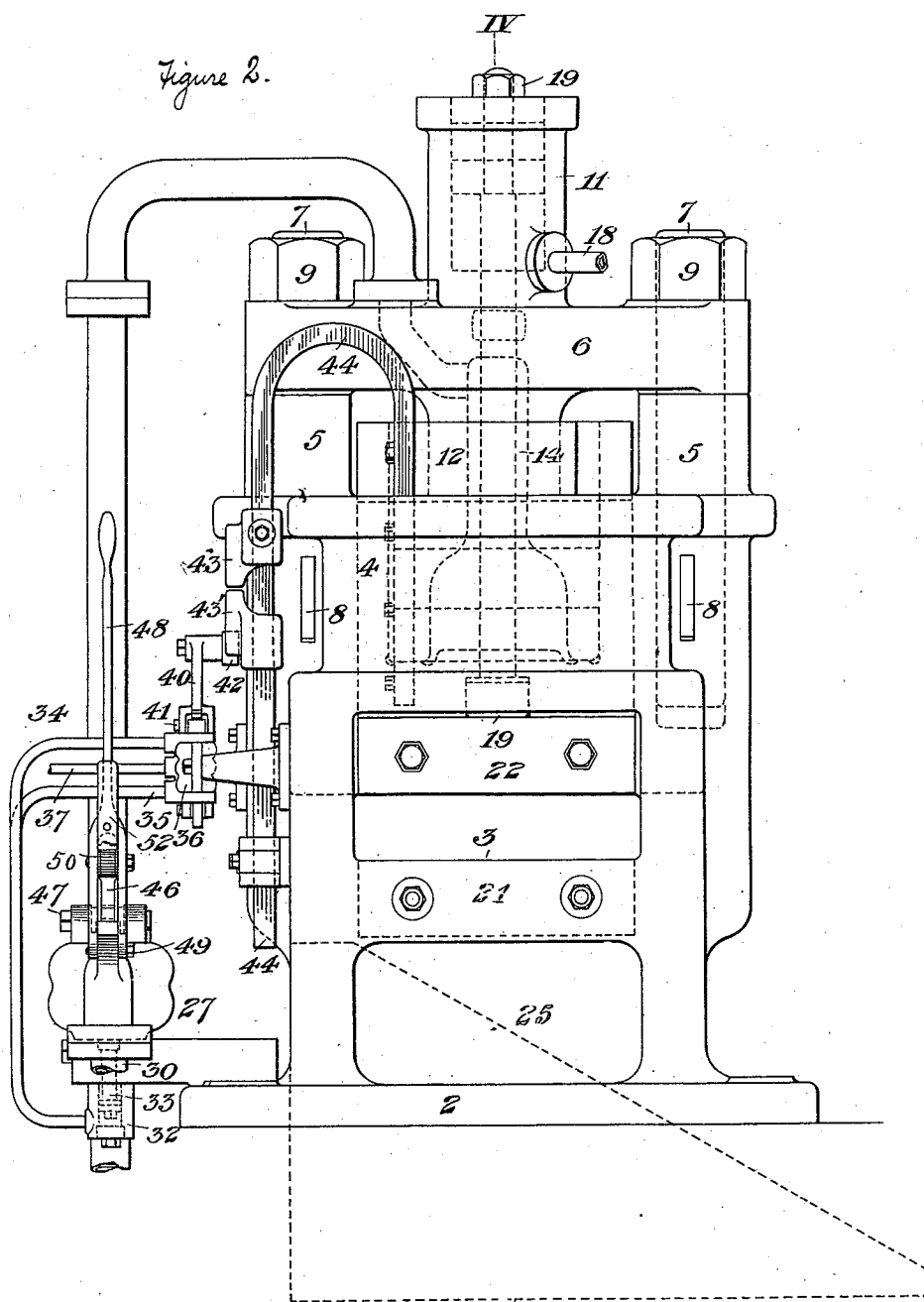
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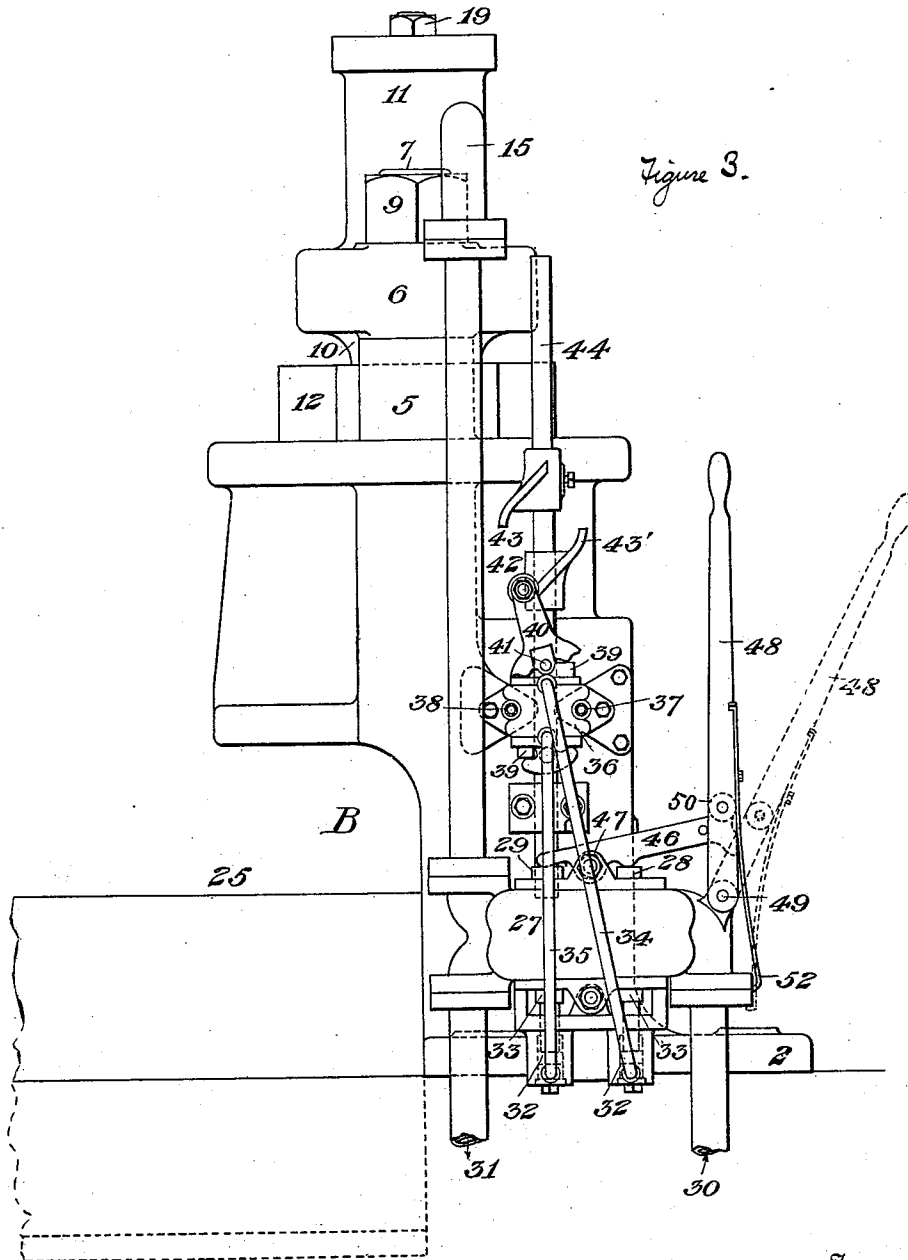
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Patented Sept. 3, 1895.



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4 Sheets—Sheet 4.

H. AIKEN.
SHEARS.

No. 545,759.

Patented Sept. 3, 1895.

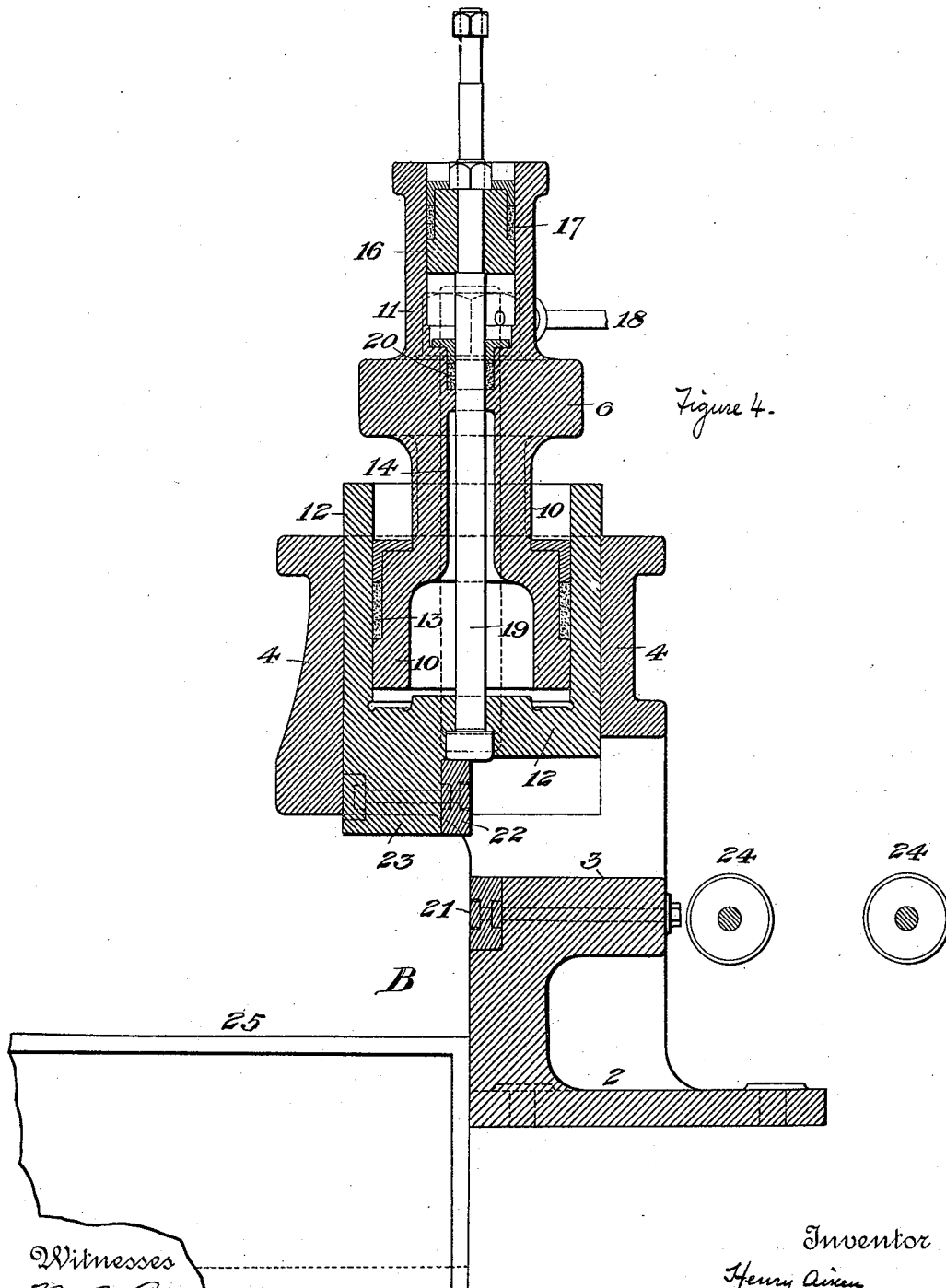


Figure 4.

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UNITED STATES PATENT OFFICE.

HENRY AIKEN, OF PITTSBURG, PENNSYLVANIA.

SHEARS.

SPECIFICATION forming part of Letters Patent No. 545,759, dated September 3, 1895.

Application filed January 10, 1894. Serial No. 496,336. (No model.)

To all whom it may concern:

Be it known that I, HENRY AIKEN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Shears, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a plan view of my improved shears. Fig. 2 is a front elevation, and Fig. 3 a side elevation, thereof. Fig. 4 is a vertical section on the line IV IV of Fig. 2.

The object of my invention is to provide 15 improved shears for shearing metal so constructed that the pieces or billets cut thereby may be delivered automatically from the shears, and may be removed thus without need of picking them up by a crane or other 20 lifting device.

In the drawings I show the frame of the shears made of two parts, the lower part comprising a base 2 and an anvil-block 3 for carrying the lower shear-knife.

25 4 is a hollow vertical guide portion, which contains the moving actuating-cylinder and has upright posts 5 above the same. The second piece of the shear-frame comprises an entablature 6, set horizontally on the posts 5 and 30 held thereto by vertical bolts 7, which pass into the lower part of the frame and are held by keys 8 and nuts 9 at their opposite ends.

10 is a stationary plunger, which projects downwardly from the entablature 6 and is 35 preferably made integral therewith, and surmounting the entablature, fixed thereto and preferably integral therewith, is a cylinder 11 designed to serve the function of a counterbalancing device, as hereinafter described.

40 12 is a moving cylinder set around the plunger 10 and within the guide portion 4, the plunger being provided with suitable packing 13. The stem of the plunger is hollow and affords a water-passage 14 leading to the 45 cylinder, to which water is supplied by a supply-pipe 15 extending from a controlling-valve hereinafter described. The counterbalancing-cylinder has a movable plunger 16, packing 17, and water-supply pipe 18. Its 50 plunger is connected with the cylinder 12 by a vertical rod 19, which extends from the

plunger 16 down through the hollow plunger 10 and is attached to the cylinder, as shown in Fig. 4.

20 is a stuffing-box set between the cylinder 11 and the hollow passage of the plunger 10 to prevent leaking of water from one to the other around the rod 19.

In operation of the shears I prefer that the water-pressure should be exerted constantly 60 in the cylinder 11, which is of small cross-sectional area and thus serves as a constantly-acting counterbalance for the cylinder 12.

The anvil-block 3 does not extend entirely across to the back of the shear-frame, but terminates at a middle point, affording under the rear half of the cylinder a gap B, open at one or both sides. The stationary knife-blade 21 is secured to a seat on the anvil-block at the rear edge of the latter, and the moving knife 70 22 is secured to the middle portion of the cylinder, so that its cutting-edges shall be directly opposite to the cutting-edge of the knife 21 and shall be adapted to operate in conjunction therewith.

23 is a downwardly-projecting portion on the cylinder, through which pass the bolts for holding the moving knife. The upper and lower knife-blades are set in a vertical plane coincident with or substantially parallel with the plane of the shear-frame, which is the plane of the main vertical bolts above described. Feed-rollers 24 are placed at the front of the shears to facilitate the feeding 85 of the metal, and at the rear of the shear-frame, extending laterally from the gap B, is an inclined chute 25 for carrying off to a suitable conveying-table the metal pieces or billets as they are cut.

In the operation of the shears the metal to 90 be cut is fed by the feed-rollers 24 so as to rest upon the anvil-block 3 and bed-knife 21. The cylinder 12 is then depressed by water admitted into the cavity 14 of the plunger, and the moving knife is caused thereby to 95 shear off the metal against the knife 21, the cut piece dropping upon the chute 25 and descending the same laterally to the conveying table, by which it is removed. The moving knife is elevated by manipulating the controlling-valve so as to cut off the water-passage 14 from the source of supply and to put 100

it into communication with the exhaust, whereupon the counterbalancing - cylinder and plunger will elevate the cylinder 12 and displace the water therefrom.

5 The construction of the shear-frame above described, by which a laterally open gap is afforded for the automatic removal of the metal as it is cut, will be recognized by those skilled in the art as being of great advantage.

10 I will now describe the valve mechanism which I prefer to use for rendering the shears automatic in their action. The main water-supply pipe 15 of the shears extends from a three-way valve 27, which may be otherwise

15 constructed in the manner described and shown in my prior patent, No. 465,232, dated December 15, 1891, said valve being provided with two pistons 28 and 29, adapted to be moved so as to put the pipe 15 into commu-

20 nication with the main supply-pipe 30 or with an exhaust-pipe 31, or to cut it off from communication with both. To operate the piston-valves 28 and 29 of the three-way valve 27 I employ small single-acting auxiliary cylin-

25 ders 32, having pistons 33, which project and are adapted to engage the ends of the piston-valves, and to operate these cylinders I employ water-supply pipes 34 35, which extend from the ports of an auxiliary four-way valve

30 36. This valve may also be constructed as shown in my patent, as supply and exhaust pipes 37 and 38 and two piston-valves 39 are adapted to move in opposite directions and to assume one of two positions, as desired, so as to

35 connect either one of pipes 34 35 with the supply and the other with the exhaust. To operate the piston-valves of the valve 36 I may employ a suitable hand-lever; but to work them automatically I use a rock-lever 40, pivoted at 41, and having a projecting arm (which may be provided with a laterally-projecting

40 antifriction-roller 42) adapted to be engaged by projections or tappets 43 43' on a rod 44, which is connected to and moves with shear-actuating cylinder 12. In the drawings I show the rod 44 reflexed and connected directly to the cylinder 12. For locking the piston-valves of the valve 27 I employ a rocking-

45 lever 46, pivoted at 47, and provided at opposite sides of its pivot with projections which engage the ends of the piston-valves 28 and 29, respectively. The outer portion of this lever 46 passes through a slot or yoke in a hand-lever 48, which is oscillatory in a pivot

50 49, and may be provided with an antifriction-roller 50, adapted to bear on the outer side of the lever 46 when the parts are in locked position.

60 In Fig. 3 I show the valve 27 in locked position, the lever 46 being held by the hand-lever 48, so as to prevent longitudinal motion of the piston-valves by action of the auxiliary cylinder 32, the water-pressure being preferably continuously exerted in one of these auxiliary cylinders. The shear-cylinder is then

65 elevated. If, now, it be desired to depress the moving knife to shear the metal, the lever

48 is moved so as to disengage it from the lever 46, whereupon the auxiliary cylinder 32 and its piston, being free to act, project the piston-valve 28, which, acting through the lever 46, retracts the other piston-valve 29. This establishes communication between the main cylinder 12 and the water-supply and forces down said cylinder, as before explained, carrying with it the rod 44 and tappets 43 43'. As the cylinder nears the end of its stroke the tappet 43 engages the antifriction-roller 42 and moves the lever 40 laterally to the right, as shown in Fig. 3, and when the end of the stroke is reached the lever has been moved far enough to operate the piston-valves 39, reversing their position, so as to connect one of the cylinders 32 with the supply and the other with the exhaust. The first-named cylinder 32 then acts to project its piston and to reverse the piston-valves of the valve 27, thereby connecting the pipe 15 with the exhaust and permitting the counterbalancing-cylinder to lift the shear-cylinder. When the cylinder comes to the end of its upstroke, the tappet 43' engages the roller 42 and moves the lever 40 to its original position, (shown in Fig. 3;) but if it be desired to stop the motion of the parts the operator, before the end of the upstroke has been reached, moves back the lever 48, so as to engage the lever 46, whereupon the cylinder 12, at the end of its stroke, comes to rest. When it is desired that the shear-cylinder should operate continuously, the lever 48 may be moved to the right to its full extent, as shown by dotted lines in Fig. 3, in which position it is held by engagement of a locking-spring 52 with a shoulder on the shear-frame. When said spring is released, its tension will throw the lever over to the left to the position indicated by full lines.

Within the scope of my invention as stated in the claim of this application many changes may be made in the form, relative arrangement, and construction of the parts of the apparatus; since

What I claim as new, and desire to secure by Letters Patent, is—

115 Metal shears, having a frame with upright bolts connecting the entablature with the base, a vertically acting motor comprising a cylinder and plunger, a knife fixed in the plane of said bolts to the middle part of the end of the moving part of the motor, an anvil-block forming part of said frame and terminating at a middle point at the plane of the knives and affording a laterally open gap under the rear part of the motor which overhangs said gap, and a stationary knife fixed to the anvil-block; substantially as described.

In testimony whereof I have hereunto set my hand.

HENRY AIKEN.

Witnesses:

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JNO. B. SCOTT.