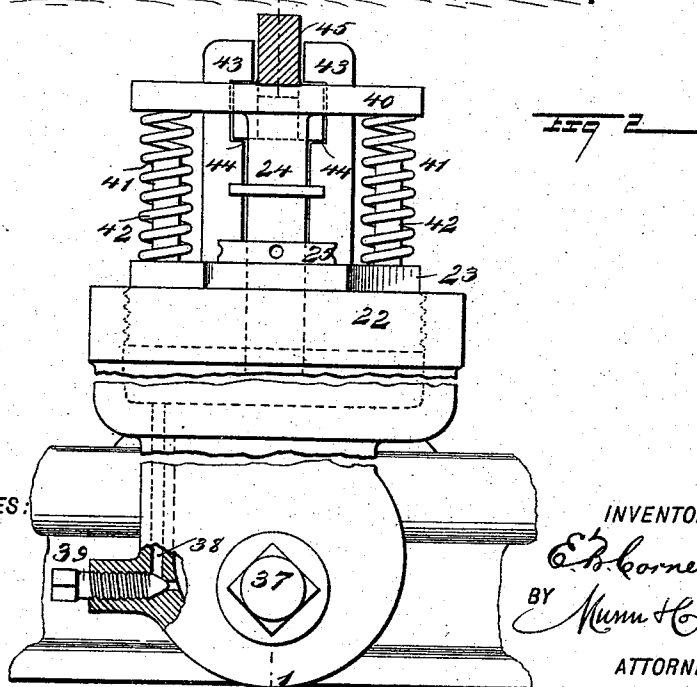
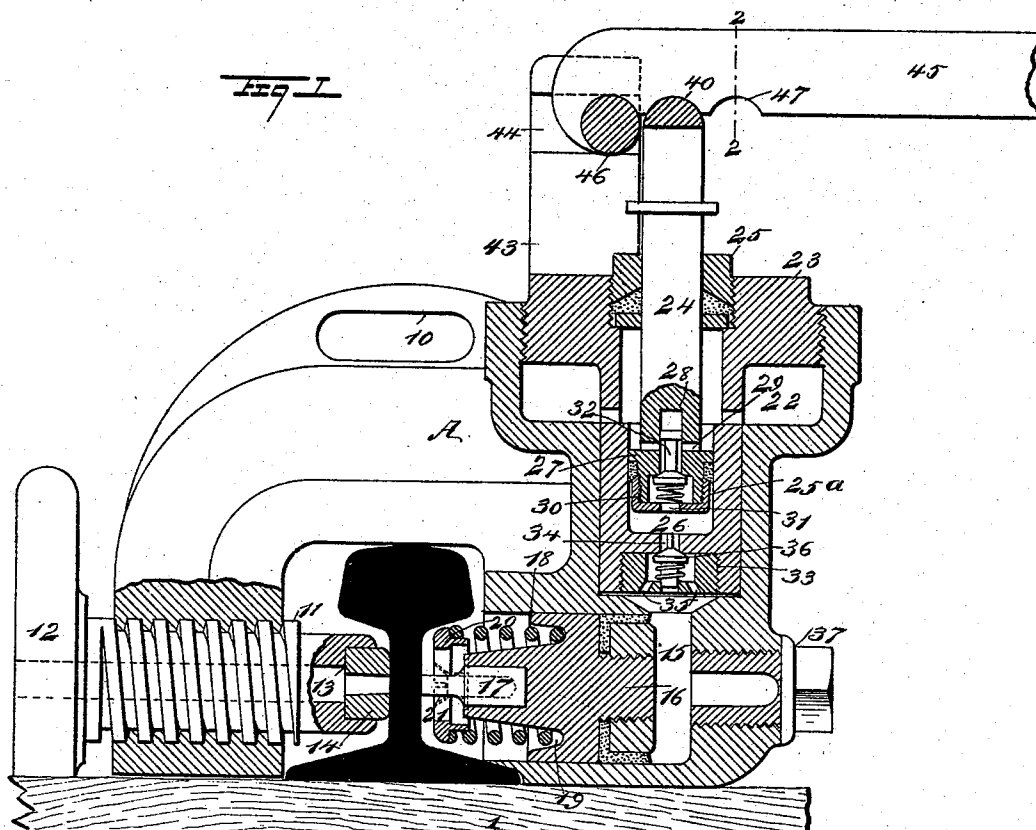


(No Model.)

E. B. CORNELL.
PORTABLE HYDRAULIC PUNCH.

No. 532,265.

Patented Jan. 8, 1895.



WITNESSES:

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ELIJAH B. CORNELL, OF PHILADELPHIA, PENNSYLVANIA.

PORTABLE HYDRAULIC PUNCH.

SPECIFICATION forming part of Letters Patent No. 532,265, dated January 8, 1895.

Application filed December 2, 1893. Serial No. 492,568. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH B. CORNELL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Portable Hydraulic Punch, of which the following is a full, clear, and exact description.

My invention relates to a portable hydraulic punch, especially adapted for use in producing apertures or openings in the web of railway rails, or in metal beams or plates of any description, being likewise adapted for use in structural, architectural, bridge and other iron work.

A further object of the invention is to provide such a punch which may be expeditiously set in position and manipulated, and which may as readily and conveniently be released from the object to which it is applied.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in both the views.

Figure 1 is a section through the punch and a railway rail to which it is applied, the said section being taken practically on the line 1—1 of Fig. 2; and Fig. 2 is a partial rear elevation and partial sectional view of the punch, the section being taken practically on the line 2—2 of Fig. 1.

In carrying out the invention the body A of the punch is made in arch form, something after the shape of an inverted U, and is provided at its upper bow portion with a hand hold 10, or the equivalent thereof. One member of the body is provided with a longitudinal threaded bore, adapted to receive a screw shaft 11, which shaft may be, and preferably is, provided at its outer end with a hand wheel 12, or the equivalent thereof, but the inner end of the shaft is without a thread, and is provided with a socket 13, adapted to hold a die 14, which receives the material punched from the article operated upon, and the punch when passed through the article. The opposite member of the body is made tubular from top to bottom, being provided at its lower end

with a horizontal chamber 15, preferably circular in cross section, the said chamber being adapted to receive a piston 16, which is held to slide in the chamber. This piston is provided with a socket to receive a punch 17, as shown in Fig. 1, and the outer portion of the piston at its center is so shaped that a spring 18 may be coiled around it, the spring having bearing in a seat 19, produced in the piston, and the said spring has likewise bearing against a collar 20, which collar is provided with lugs at each end, and is attached to the inner end wall of the chamber 15, through the medium of screws 21, shown in dotted lines Fig. 1, and by adjusting these screws more or less tension may be applied to the spring 18, and consequently the piston be made to move rearward in its chamber with greater or less velocity when its path is cleared.

A large chamber 22 is located above the chamber 15, the chamber 22 being adapted as a reservoir for the liquid used in the punch. The reservoir or upper chamber 22 is substantially closed by a cap 23, which cap is located at the upper end of the chamber and extends downward within the same, usually at its center, as shown in Fig. 1.

A plunger rod 24, is held to slide in glands 25, located in the cap 23, and the said plunger rod carries at its lower end a plunger 25^a, the said plunger having movement in a chamber 26, communicating with the bottom portion of the reservoir 22 at its center. The downwardly projecting central portion of the cap 23, is adapted as a guide for the plunger 25^a when said plunger is in its upper position, and the chamber 26, which may be termed an intermediate chamber, is adapted to receive the charge of liquid to be forced against the piston 16 by the plunger rod upon its downward stroke. The plunger may be said to consist of a tubular head 27, formed upon the lower end of the plunger rod, the rod being provided with a longitudinal bore 28, leading into the cavity of the head, and horizontal bores 29 leading into the vertical bore, the head being normally covered by a cap 30, having an opening 31 about centrally located in its bottom surface. The valve 32, shown in the drawings, is a puppet valve, and is normally seated in the head, closing the outlet end of the bore 28 by the action of a

spring upon which the valve rests. Between the receiving chamber 26 and the piston chamber 15, a delivery valve 33, is located, and this delivery valve comprises a casing having an opening 34 connecting with the chamber 26, and openings 35 connecting with the piston chamber 15, the valve 36 being spring controlled and normally held seated against the discharge end of the upper opening 34.

A plug 37, is preferably introduced into the chamber 15 back of the piston 16, and when the said plug is removed access may be readily had to the said chamber for purposes of cleaning or repair.

A port 38, preferably of angular construction is made to communicate with the piston chamber 15 and with the reservoir 22; and the port is normally closed by what may be termed a needle valve 39, or the equivalent thereof, made in the nature of a screw, the inner end of which is made to enter the port 38 at the junction of its two branches, as shown in Fig. 2, and when in this position the port 38 is closed.

The plunger rod 24, is provided with a horizontal head 40, preferably rounding or cylindrical upon its upper surface, and the head, near each end, is made to rest upon springs 41, located around guide posts 42, placed upon the cover 23 of the reservoir. Standards 43, are likewise erected upon the cover of the reservoir, and the said standards are provided with recesses 44 in opposing surfaces, as shown in both of the figures. The handle 45, is in the nature of a lever, and may be of any desired length, but is provided at one end, which is preferably cylindrical, with a T-head 46, usually circular in cross section, and the said head is made to enter the recesses 44 in the standards. One or more cavities 47, are made in the under surface of the handle near its T-head, said cavities being adapted to receive the cylindrical surface of the plunger head 40, and thus the handle may be lengthened or shortened by placing one or the other of the cavities in engagement with the plunger head, and consequently carrying the handle head to a greater or less distance from the plunger head.

In operation, the members of the body are placed one at each side of the article to be operated on, a beam for example, and the screw shaft 11 is manipulated until the die 14 is against the beam and at the surface to be punched. The handle is then pressed downward, whereupon the liquid that was contained in the intermediate chamber 26 will be forced through the valve 33 into the piston chamber 15, and the piston will be forced outward, causing the punch carried thereby to enter and pass through the beam. The valve 33 will not permit any liquid to escape from the piston chamber 15, and when the plunger 25^a is raised by the springs acting upon the plunger rod, the liquid contained in the reservoir will pass through the suction valve into the intermediate chamber 26, ready to be

driven through the delivery valve into the piston chamber. As the piston is forced outward the spring 18 is compressed, or put under tension; and when it is desired to remove the punch from the beam the valve 39 is manipulated to clear the port 38, whereupon the liquid will escape through the port into the reservoir 22, as the spring 18 will act to force the plunger back into its chamber.

The punch may be made exceedingly simple and durable, and it is evident that it may be conveniently operated and expeditiously placed in position, and that the body A may be given any shape best adapted for application to the article upon which it is to be operated.

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

1. A hydraulic punch, comprising a body having recess in its lower edge to straddle a rail, a die in one wall of said recess, a horizontal chamber in the opposite wall, a piston mounted in said chamber and having a punch socket or holder opposite said die, a vertical chamber communicating at its lower end through a check valve with said horizontal chamber, and having a reservoir communicating with its upper end, a valved plunger in the said vertical chamber to permit liquid to flow past its valve into said chamber, a plunger rod extending upwardly through a gland in the top of said vertical chamber and a spring pressed operating mechanism connected with its upper end, and comprising a lever having an adjustable fulcrum at its inner end, and a notched or recessed lower edge in rear of its fulcrum and engaging the upper end of the plunger rod, substantially as set forth.

2. In a hydraulic punch, the combination with the punch piston, of a coil spring bearing thereon and pressing it inwardly, and an adjustable external head for regulating the tension of the spring and having an opening for the outer end of the piston to work through, substantially as set forth.

3. The combination with a plunger rod having a cross piece at its upper end, and springs on which said cross piece seats, of the spaced standards parallel with and to one side of the said plunger rod and provided with transverse grooves or recesses in their adjacent faces, and the operating lever having fulcrum lugs working in said grooves or recesses and provided in its lower edge with a plurality of notches or bearings to receive the upper edge of said cross bar, substantially as set forth.

4. The combination with the body of the implement having a chamber for the punch piston and a larger chamber therebeyond, a chamber for the plunger mechanism; the latter chamber being enlarged at its open upper end into the reservoir 22, of the cap 23 closing the top of the reservoir and having a central cylindrical extension forming the plunger

chamber 26 provided between its ends with lateral openings leading into the reservoir and having an opening 34 and a valve chamber, a valve 36 in said chamber and closing upwardly over said opening, a screw threaded casing screwing into said valve chamber, holding the valve 36 in place and provided with apertures 35 communicating with the rear end of the chamber of the punch piston, the valved plunger working in the said cylindrical extension and having a stem or rod extending up through a gland in the cap 23, and means for operating the plunger rod, substantially as set forth.

5. A hydraulic punch, comprising the U-shape body, a screw extending transversely

through one leg of the body and a transverse chamber in the opposite leg, a piston working in said chamber and having a reduced outer end having a punch socket or holder, and an external spring provided with a tension regulating seat or head, having an opening through which said reduced end freely slides, a vertical chamber having valved communication at its lower end with said transverse chamber, the valved plunger and its operating mechanism, substantially as set forth.

ELIJAH B. CORNELL.

Witnesses:

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JAS. W. NAGLE.