(No Model.)

R. H. TWEDDELL, J. PLATT & J. FIELDING.

HYDRAULIC RIVETING MACHINE.

No. 307,359. Patented Oct. 28, 1884.

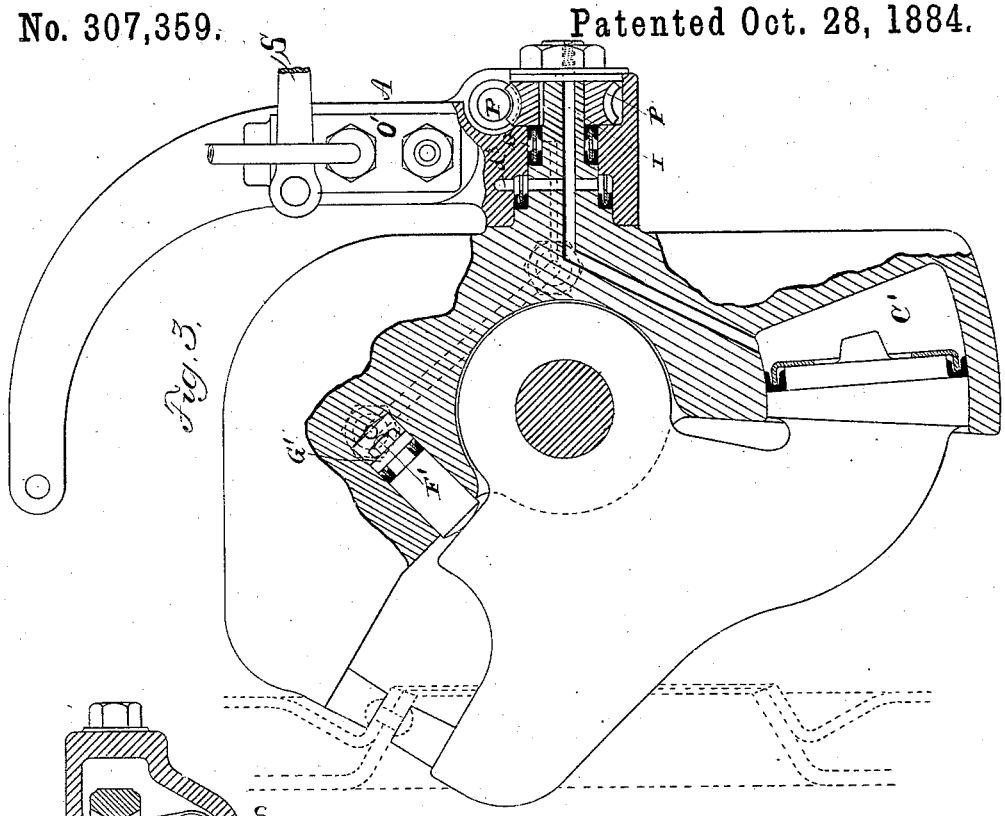

Fig. 3.

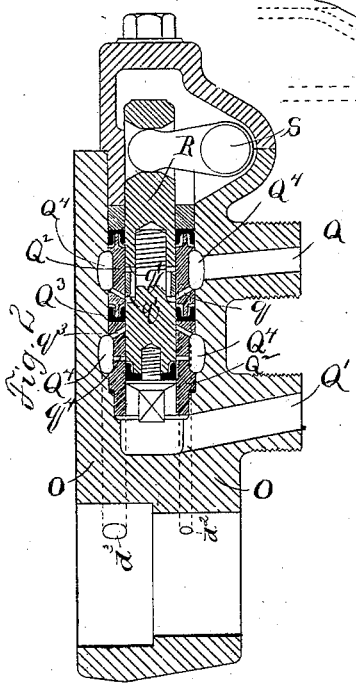

Fig. 2.

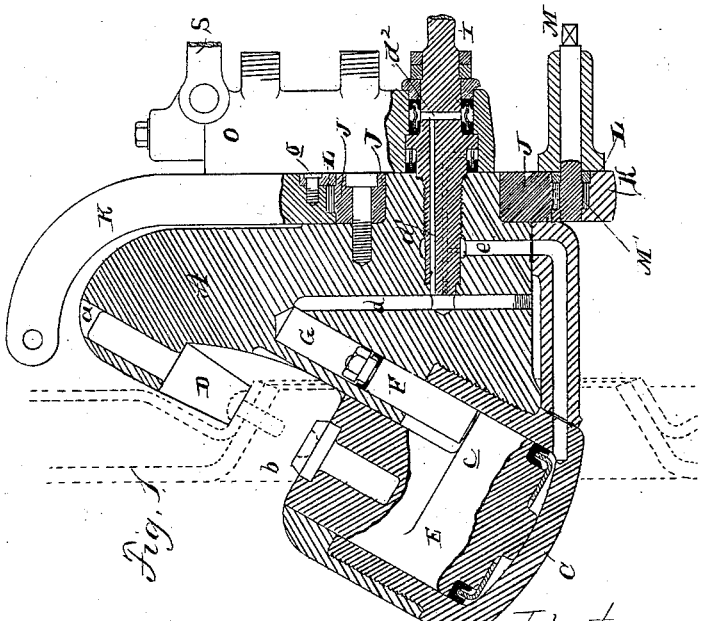

Fig. 1.

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UNITED STATES PATENT OFFICE.

RALPH HART TWEDDELL, OF WESTMINSTER, COUNTY OF MIDDLESEX, AND JAMES PLATT AND JOHN FIELDING, OF GLOUCESTER, COUNTY OF GLOUCESTER, ENGLAND.

HYDRAULIC RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 307,359, dated October 28, 1884.

Application filed April 25, 1884. (No model.) Patented in England November 10, 1880, No. 4,609.

To all whom it may concern:

Be it known that we, RALPH HART TWEDDELL, of Westminster, county of Middlesex, and JAMES PLATT and JOHN FIELDING, of Gloucester, in the county of Gloucester, and Kingdom of Great Britain, have invented certain new and useful Improvements in Hydraulic Riveters; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in hydraulic riveters, the object of the same being to provide a device adapted particularly for riveting a set of rivets arranged circularly and obliquely around a fire-hole or other opening; and it consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in vertical longitudinal section of one form of machine embodying our invention. Fig. 2 is a similar view of the valve, and Fig. 3 is a view in side elevation, partly in section, of another form of machine.

A represents a metal frame larger at one end than at the other, and provided at its enlarged end with the movable cylinder C, which latter is secured into the frame A. This frame is triangular in shape, as shown in Fig. 1, and is provided at its smallest end with a socket, *a*, into which the removable riveting-tool D is secured.

Within the cylinder C moves the plunger E, which latter is provided with a riveting-tool, *b*, adapted to move in a plane with the tool D and with the offset or enlargement *c*, against which the outer end of the push-back plunger F abuts. This plunger moves in the cylinder G, formed in the frame A, and is supplied with pressure-water through the ports *d*, *d'*, and d^2. The object of this small plunger is simply to force the large plunger back into its cylinder when the pressure-water is cut off from the larger cylinder.

The trunnion I is provided with two ports communicating, respectively, with the ports *d'* and *e*, and is rigidly secured to the frame A, and forms the axis on which it turns.

The frame A is provided with a pinion, J, rigidly secured thereto, and is supported by the curved arm K, which latter terminates at its upper end over the vertical center of the machine, the lower end of said arm being formed into a ring adapted to embrace the pinion J. This curved arm is held in position on the machine by the removable circular band L, which is secured to the curved arm K by screws *o*.

In the lower end of the ring of the curved arm K is journaled a shaft, M, carrying a pinion, M', which meshes with the teeth of the pinion J, secured to the frame of the machine. The end of the shaft M is made angular, onto which a hand-wheel or wrench can be secured for the purpose of turning the shaft and pinion M'. By thus journaling the machine to the curved arm and employing the pinions above described, the entire machine can be turned on the curved arm so as to head a circular row of rivets without altering the position of the curved arm.

The trunnion I of the riveter extends outwardly beyond the frame of the machine, and is suitably packed within the lower open end of the valve-casing O. This valve-casing is rigidly secured to the curved arm K, while the trunnion is free to turn in the lower end thereof. The valve-casing O is made of two or more parts, and is provided with a supply-opening, Q, and a discharge-opening, Q', the stationary rings Q^2, and the flexible packing-rings Q^3. Between the stationary rings Q^2 and the casing O are formed annular chambers Q^4, the upper one of which is in direct communication with the supply-opening Q, while the lower one is adapted to effect a communication between the fluid supply and the main cylinder, and also with the main cylinder and discharge, as will be described later on. The upper stationary ring is provided with the ports *q*, adapted to register with ports *q'* of the valve R, while the lower stationary ring, Q^2, is provided with the ports q^3, adapted to register with the lower ends of the ports *q'* of the

valve R, and with the ports q', communicating with the lower chamber Q^4, for discharging the water therefrom. The small port d^2 communicates with the upper chamber Q^4, and hence the pressure-water is always acting on the small plunger F, while the larger port d^3, which conveys the water by means of the port e to the larger cylinder, is only in communication with the water-supply when the valve R is operated by the lever S. When the valve R is in the position shown in Fig. 2, the water is confined in the cylinder C; but by elevating the valve R until the lower edge of the bearing-face thereof is elevated above the discharge-ports q^4 the water in the cylinder C is permitted to flow out of the machine through the port d^3, lower chamber Q^4, and discharge-orifice Q'. By depressing the piston until the upper ends of the ports q' register with the ports q and the lower ends of said ports q' with the ports q^3 of the lower chamber Q^4, a continuous passage is formed, which permits the pressure-water to pass into the cylinder C.

In Fig. 3 we have shown another style of machine, which can be employed in substantially the same manner. This machine consists of two levers pivoted at or near their centers, each of said levers being provided at their outer ends with a riveting-tool, and one of said levers being provided at its rear end with a cylinder, C', while the adjacent end of the other lever is provided with a piston moving in said cylinder. On the opposite side of the fulcrum from the cylinder and piston referred to is situated the small push-back cylinder G', in which the small push-back plunger F' moves. This small cylinder is supplied with water through the port shown in dotted lines, while the larger cylinder is supplied with water through the port shown in full lines, both of said ports, however, passing through the trunnion I and communicating with the ports d^2 and d^3 of the valve O'. In this instance the curved arm is loosely secured directly to the trunnion, and is provided with a worm, P, which latter meshes with a worm-wheel, P', rigidly secured to the trunnion I. By simply turning the worm the riveting-machine can be turned completely around, so as to enable it to head a complete row of rivets. The small push-back cylinder G' is always in communication with the supply, while the supply to the larger cylinder C' is regulated by the valve, which is similar to the construction previously described. By admitting water to the larger cylinder the ends of the levers to which the riveting-tools are secured are forced together, and by moving the valve so as to open the discharge the small push-back plunger F' separates the riveting-tools and moves the plunger within the cylinder C', and holds it there until the supply is again opened to said larger cylinder.

By means of either of the forms shown and described we can without any difficulty whatever head a complete set of rivets arranged circularly and obliquely around an opening without altering the position of the curved suspending arm.

We are aware that it is not broadly new to journal a riveter to a supporting-arm and employ devices for turning the riveter to various positions, and hence we make no broad claim thereto; but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a supporting-arm and a portable riveting-machine journaled to said arm, the riveting-tools being situated obliquely to the axis of the machine, of the devices, substantially as described, connecting the machine and arm, whereby the machine can make a complete revolution.

2. The combination, with a suspending arm and a valve rigidly secured to said arm, of a hydraulic riveting-machine journaled to the arm and in communication with the valve.

3. The combination, with a suspending arm and a valve rigidly secured thereto, of a hydraulic riveting-machine journaled to said arm and in communication with the valve, and the devices, substantially as described, for turning the machine on the arm, substantially as set forth.

4. The combination, with the suspending arm and valve secured thereto, of the riveting-machine, the pinion J, rigidly secured to the machine, the pinion M', meshing with said pinion J, and the shaft for turning the pinion M'.

5. The combination, with the suspending arm, constructed substantially as described, and the valve secured to said arm, of the frame A, journaled to the suspending arm and provided with a stationary riveting-tool, a plunger carrying a riveting-tool, the push-back plunger, ports connecting the cylinders of both plungers with the valve, and the pinions and shaft, substantially as set forth.

6. The combination, with a riveting-machine having a trunnion on which it can be rotated, of a valve-box through which said trunnion passes, and a valve for regulating the flow of the actuating-fluid to said riveting-machine, substantially as set forth.

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

RALPH HART TWEDDELL.

Witnesses:
H. G. SCOTT,
WM. BAILEY.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

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