No. 747,272. PATENTED DEC. 15, 1903.

J. W. TIERNEY.

SUPPORTING DEVICE FOR SHELL RIVETERS.

APPLICATION FILED AUG. 29, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

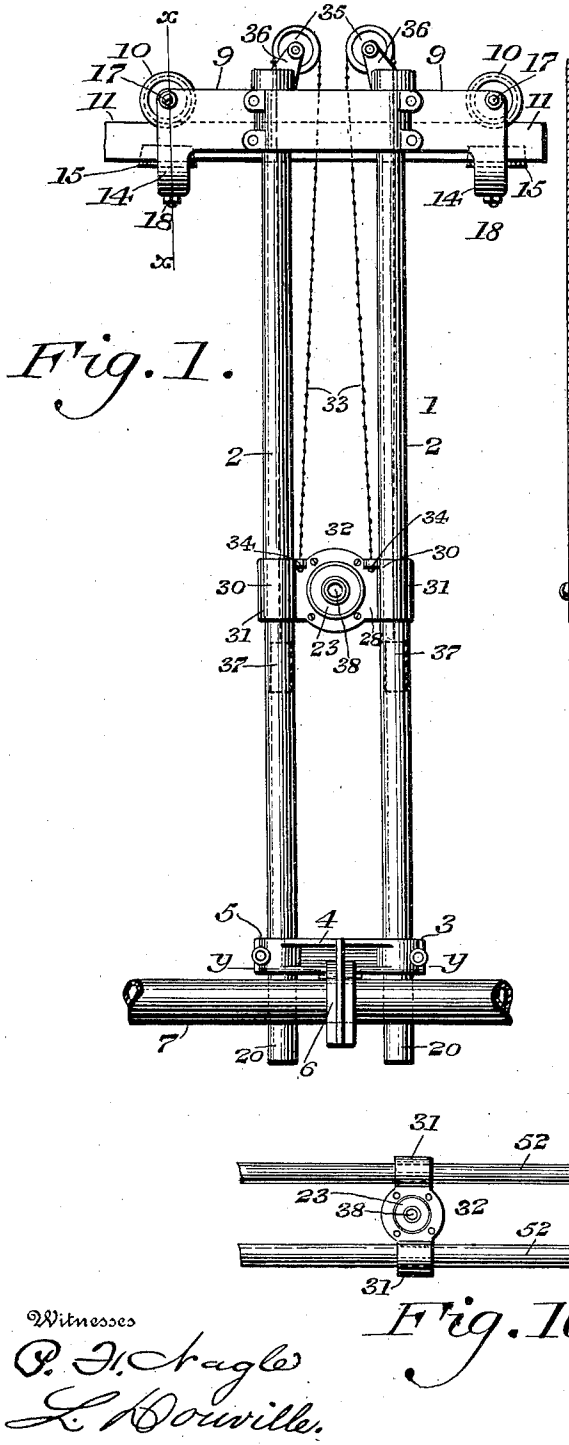


Fig. 1.

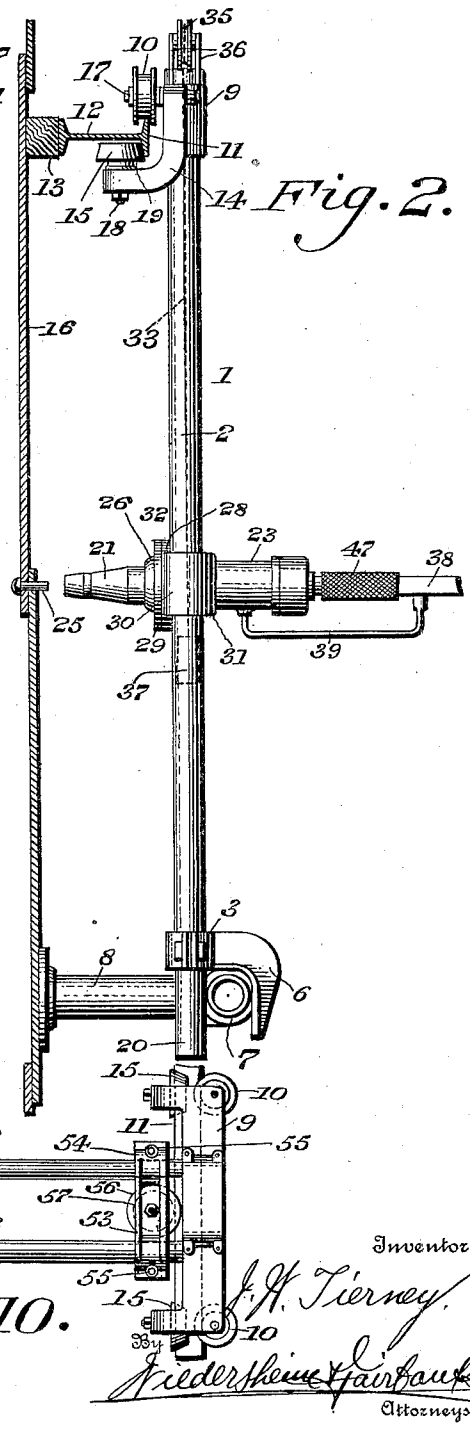


Fig. 2.

Fig. 10.

Witnesses

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

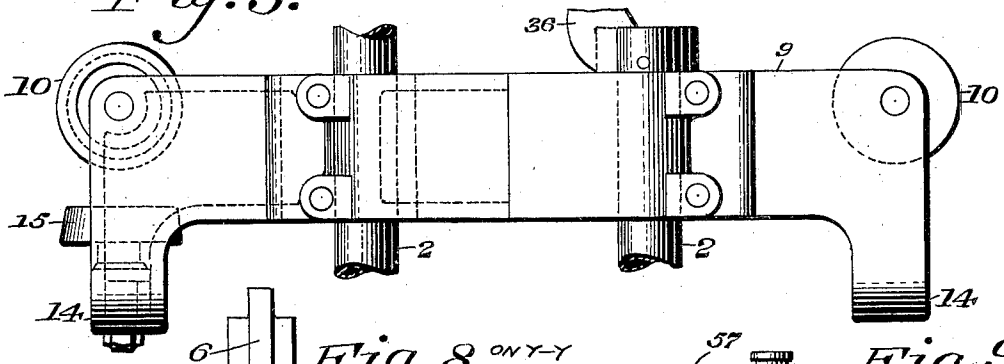


Fig. 8. ON Y—Y

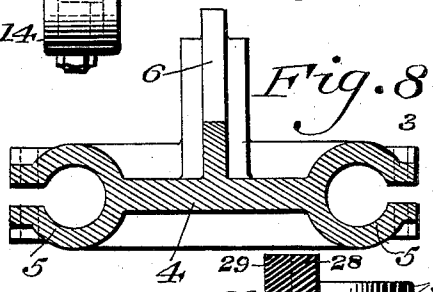


Fig. 9.

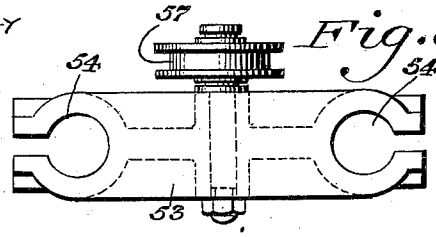


Fig. 7.

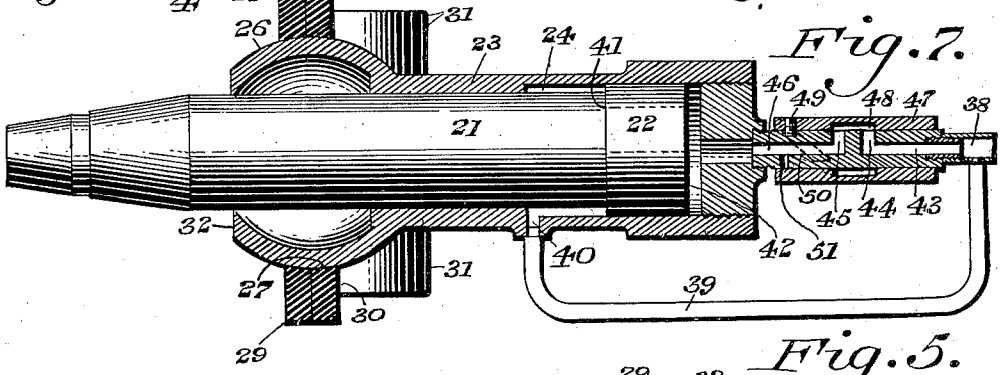


Fig. 4. ON X—X

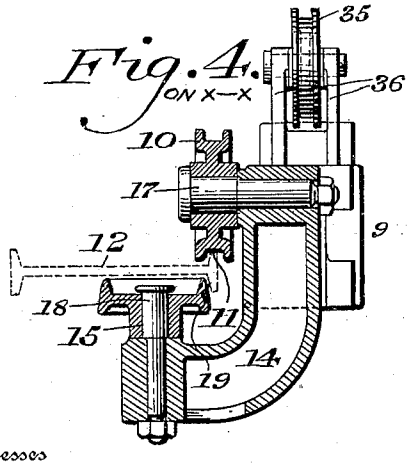


Fig. 5.

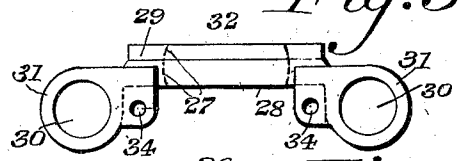
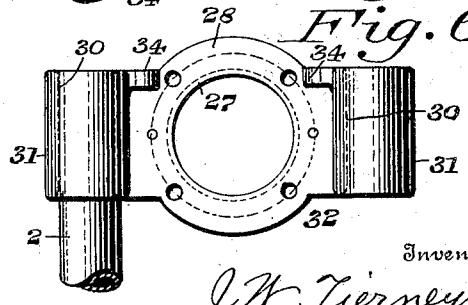


Fig. 6.



Witnesses

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No. 747,272. Patented December 15, 1903.

UNITED STATES PATENT OFFICE.

JOHN WILBUR TIERNEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO PHILADELPHIA PNEUMATIC TOOL COMPANY, A CORPORATION OF NEW JERSEY.

SUPPORTING DEVICE FOR SHELL-RIVETERS.

SPECIFICATION forming part of Letters Patent No. 747,272, dated December 15, 1903.

Application filed August 29, 1901. Serial No. 73,700. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILBUR TIERNEY, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Supporting Devices for Shell-Riveters, of which the following is a specification.

My invention consists of a novel construction of a riveting apparatus which is especially adapted to support a pneumatic riveting-hammer or similar implement which is too large or unwieldy to be manually supported for the purpose of upsetting rivets in ships, bridges, tanks, and sundry other structures, provision being made for supporting the riveting-machine in such a manner that the same can be readily raised or lowered by a counterbalancing device and also shifted laterally, means being also provided for enabling the riveting-machine to be rocked or oscillated in any direction, whereby said machine can be easily shifted from one rivet to another until all the rivets in a large area have been upset or operated upon to the desired extent without further manipulation of the supporting apparatus, all of which can be readily effected by the operator in charge of the machine.

It also consists of a novel construction of a tool-casing and its adjuncts provided with means for moving the riveting apparatus toward or away from the work by fluid-pressure, said casing being suitably supported in a ball-and-socket or other universal joint, whereby great freedom of movement in the apparatus is permitted.

It also consists of a novel construction of a frame composed of a plurality of substantially parallel preferably hollow uprights or guides, between which the riveting apparatus is supported, provision being made for preventing the improper movement of the supporting devices or frame during the action of the riveting-machine.

It also consists of a novel manner of counterbalancing the carriage containing the ball-and-socket attachment whereby the riveting-machine is supported.

It also consists of novel means for preventing the upper portion of the frame in which the riveting-tool is supported from becoming disengaged or disconnected from its support.

It further consists of novel details of construction, all as will be hereinafter set forth.

Figure 1 represents a front elevation of a riveting apparatus embodying my invention. Fig. 2 represents a side elevation of Fig. 1, showing also a portion of the work to which the apparatus is applicable. Fig. 3 represents, on an enlarged scale, a front elevation of the upper portion of Fig. 1. Fig. 4 represents a section on line $x\ x$, Fig. 1. Fig. 5 represents a plan view of the carriage. Fig. 6 represents a front elevation of Fig. 5. Fig. 7 represents a longitudinal sectional view of the apparatus for moving the pneumatic tool or riveting device in opposite directions by fluid-pressure and its adjuncts, certain portions thereof being shown in elevation. Fig. 8 represents, on an enlarged scale, a section on line $y\ y$, Fig. 1. Fig. 9 represents an end elevation of a portion of Fig. 10. Fig. 10 represents a side elevation of a slightly-modified form of apparatus.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates my novel construction of riveting device, the same consisting of a frame formed of the hollow guides 2, whose lower portions pass through the eyes or openings 5 in the clamp 3, which has the body portion 4, from which depends the hook or finger 6, which overhangs the lower laterally-extending rod or tube 7, which may be suitably supported, as by the arm 8, from the side of the ship, vessel, or tank 16.

9 designates the upper carriage, into which the upper extremities of the guides 2 are secured. The carriage 9 consists of a suitable body portion having the trolleys or rollers 10, which are in the present instance two in number, journaled in the upper corners or portions thereof, said rollers being adapted to travel on the track 11 of the I-beam 12, whose base is secured to the rail 13 or other supporting device, if desired, which may be attached to the upper portion of the shell 16.

It will of course be understood that the rail 13 may be dispensed with, if desired, and the I-beam supported in any other convenient manner.

14 designates arms which extend downwardly and inwardly from the carriage 9 and have the trolleys or rollers 15 rotatably mounted thereon, it being noted that the bearings 17 and 18 of the rollers 10 and 15 extend at substantially a right angle to each other, so that the tread of the rollers 15 contacts with the inner under face 19 of the track 11, above referred to, it being apparent that the upper I-beam 12 serves to support the carriage 9, the guides 2, and their adjuncts, while the hook or finger 6 by its engagement with the rod or tube 7 serves, in conjunction with the lower extremities 20 of said guides, to retain the lower portions thereof in proper position.

21 designates a pneumatic tool having the enlarged head or outer portion 22, which serves as a piston and is contained in the outer casing 23, the latter being bored to the same diameter as said head, whereby a chamber 24 is formed, in which said head and tool proper are reciprocated in both directions toward and away from the work 25 by fluid-pressure.

The outer casing 23 can be readily rocked or oscillated in the tool-carrier 32 by the employment of the ball-and-socket or universal joint consisting of the ball or spherical portion 26, which is movably mounted in the socket 27, which is formed in the disk or plate 28, and the flange 29, which latter is bolted or otherwise secured thereto, whereby said ball 26 is held in the desired position. The plate 28 is provided with the openings or guideways 30 in the lugs 31, through which freely pass the guides 2, whereby it will be seen that the tool, the tool-carrier 32, and its adjuncts can be readily raised or lowered or rocked in the desired direction, according to requirements, said tool-carrier being held at the desired elevation by means of the connections 33, whose lower extremities are secured to the ears 34, while their upper portions pass over the rollers 35, which are journaled in the ears 36 or other suitable support, said connections passing downwardly within the guides 2 and having the weights or counterbalances 37 attached thereto and preferably concealed within said guides.

38 designates the inlet-pipe for the motive fluid, said pipe having a branch 39 leading therefrom and discharging into the port 40 and chamber 24, whereby it will be seen that there is always constant pressure upon the small pressure area 41, which is overcome when desired by the pressure upon the large pressure area 42 of the piston 22, said pressure being admitted through the passages 43, 44, 45, and 46. The rotary valve 47 controls the ports 44 and 45 by means of the recess 48, it being apparent that when the ports are in the position seen in Fig. 7 the preponderance of pressure upon the large area 42 will move the tool 21 bodily forwardly toward the work 25 or to the left. When it is desired to move the tool 21 away from the work or to the right, the valve 47 is rotated, and by reason of the engagement of the pin 49 with the groove 50 (seen dotted in Fig. 7) the valve will move to the right until the exhaust-port 51 is open to the atmosphere, at which point the passage 45 is closed to live motive fluid, and the constant pressure upon the smaller area 41 will force the tool to the right or away from the work, as is evident, the exhaust to the atmosphere taking place through the passage 46 and port 51.

In Fig. 10 I have shown my invention as adapted to be used in riveting on the bottom of vessels, tanks, &c., the tool-carrier 32 seen therein being slidingly mounted on the guides 52. The carriage 9 seen at the right of Fig. 10 is substantially the same as the carriage 9 already described and is provided with the rollers 10 and 15, which coact with the track 11, substantially as already described with respect to the upper portions of Figs. 1 and 2. As an additional precaution to prevent disengagement of the carriage 9 from the track 11 I employ the clamp 53, having the eyes 54, through which the guides 52 pass, said clamp being secured in position by the screws, bolts, or other devices 55 and carrying the roller 56, which has the groove 57 therein, which contacts with the track 11, whereby the carriage 9 is positively guided and held in alinement on the track 11 under all conditions, as is evident. It will be understood that the left-hand portion of the apparatus seen in Fig. 10 is equipped with guiding devices similar to those seen at the lower portions of Figs. 1 and 2. The construction of the tool-carrier 32 and the manner of supporting the casing 23 of the pneumatic riveter or other tool therein (seen in Fig. 10) are substantially the same as that already described with reference to the preceding figures.

It will be understood that the carrier 32 seen in Figs. 1 and 2 can be readily raised and lowered without the application of great force thereto and that an infinite variety of movements is permitted to the riveter 21 by reason of the universal-joint support, which, used in connection with the apparatus for moving the tool 21 in both directions by fluid-pressure, reduces the labor of operating and shifting the riveting device to a minimum.

It will be apparent that various changes may be made by those skilled in the art which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction as herein shown and described.

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

1. In a riveting apparatus, a plurality of guides, a carriage in which the upper extremities thereof are secured, a tool-carrier, a pneumatic riveter or other tool supported in said

carrier intermediate of said guides, and counterbalancing devices for the same.

2. In a riveting apparatus, a plurality of guides, a carriage in which the upper extremities thereof are secured, a tool-carrier located intermediate of and bridging the space between said guides and movable on the latter and a riveting device mounted in said carrier.

3. In a riveting apparatus, a plurality of guides, a carriage in which the upper extremities of said guides are secured, rollers mounted on said carriage, a track for said rollers, guiding devices for the lower portions of said guides, and a riveting device located intermediate of said guides and mounted in said carrier.

4. In a riveting apparatus, a plurality of guides, a carriage in which the upper extremities of said guides are secured, a tool-carrier movably mounted thereupon, a riveting device mounted in said tool-carrier between said guides, rollers supported at the upper portion of said guides, connections leading from said tool-carrier over said rollers, and thence downwardly within said guides and weights attached to said connections.

5. In a riveting apparatus, a frame composed of a plurality of guides, a carriage in which the upper ends of said guides are secured, a track suitably supported, rollers on said carriage contacting with the upper and lower portions of said track, another set of rollers mounted on said carriage, counterbalancing devices passing over said last-mentioned rollers, and a tool-carrier movably supported on said guides, and connected to said counterbalancing devices.

6. In a riveting apparatus, a frame composed of a plurality of guides, a carriage in which the upper extremities of said guides are secured, a track suitably supported, rollers carried by said carriage and adapted to contact with said track, a clamp joining the lower portions of said guides, a lower laterally-extending guiding device and a finger depending from said clamp and adapted to be engaged by said guiding device.

7. In a pneumatic riveter, guiding devices, a carriage in which the upper extremities of said devices are secured and by which they are capable of lateral movement, a tool-carrier slidingly mounted thereon, a riveting device located intermediate of said guiding devices and mounted in said carrier, counterbalancing devices for said tool-carrier, and means for retaining the extremities of said guiding devices in proper position.

8. A rigging for pneumatic hammers, comprising a supporting-rail, vertical guide-tubes suspended at their upper ends from said rail and movable horizontally along the same, a counterweighted hammer-carrier mounted to slide vertically on said tubes, and a confining-rod parallel with the supporting-rail and adapted to engage the lower ends of said tubes, as and for the purpose set forth.

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