E. T. REYNOLDS.

RIVETING APPARATUS.

APPLICATION FILED SEPT. 16, 1918.

1,332,519.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

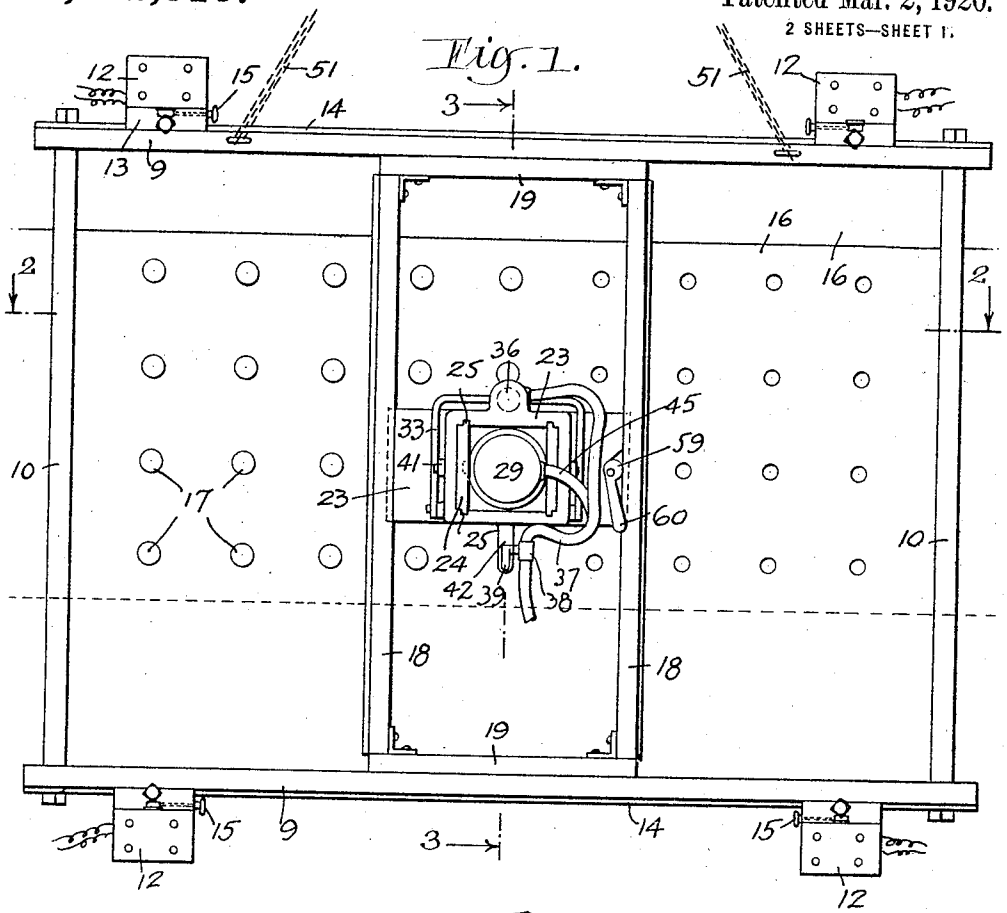
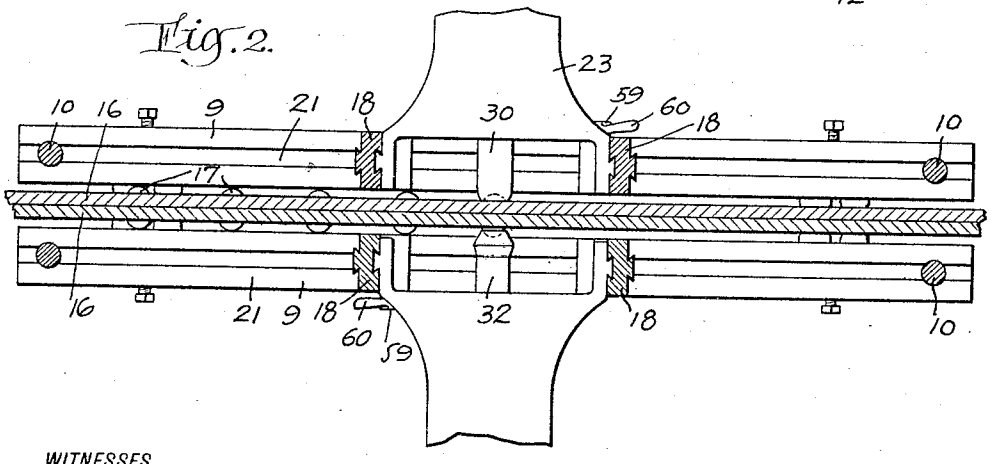


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

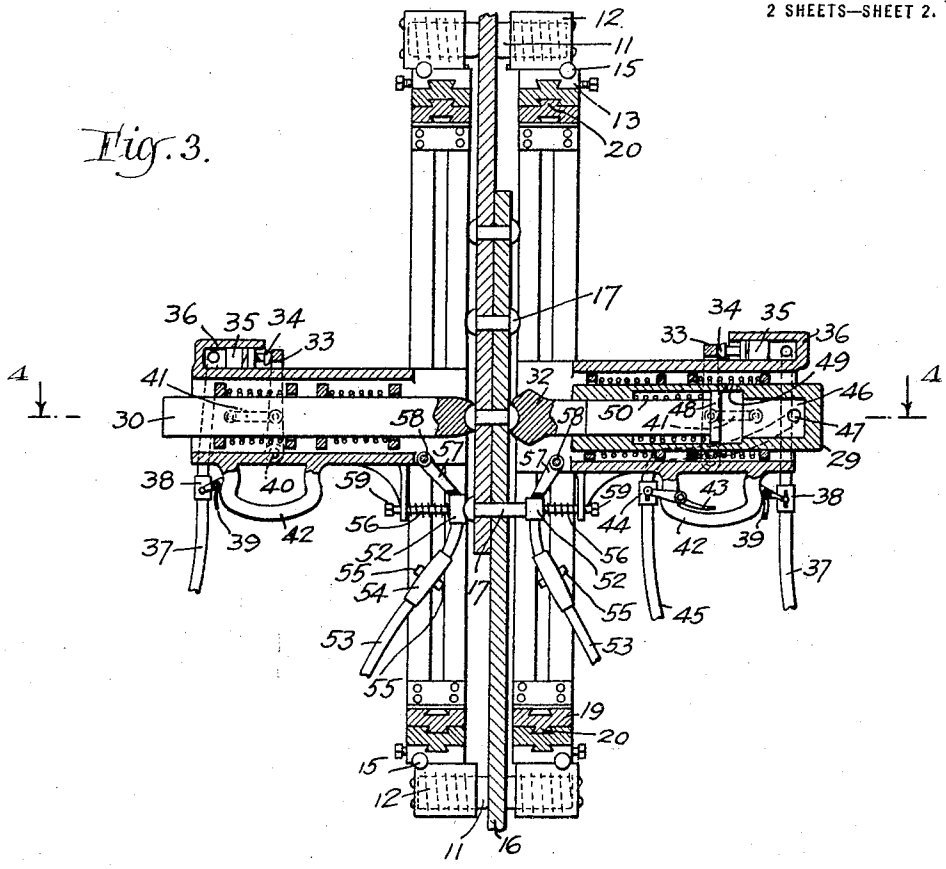
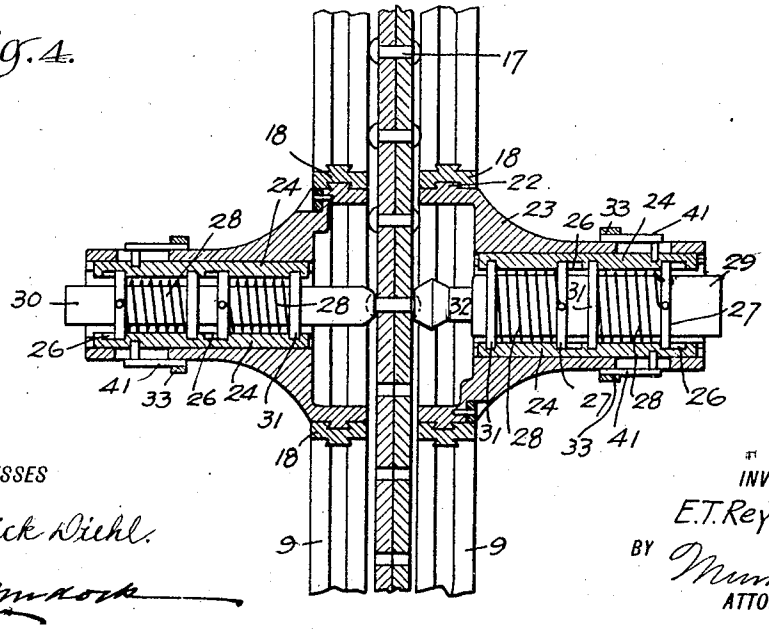


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDGAR T. REYNOLDS, OF BROOKLYN, NEW YORK.

RIVETING APPARATUS.

1,332,519. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed September 16, 1918. Serial No. 254,385.

To all whom it may concern:

Be it known that I, EDGAR T. REYNOLDS, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Riveting Apparatus, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide means for magnetically supporting metal working tools in service; to provide for absorbing shock incident to the operation of tools such as pneumatic hammers or riveters; to heat one rivet simultaneously with the heading or setting of another rivet; and to reduce the manual labor in riveting or similar mechanical operations.

Drawings.

Figure 1 is an elevation of a supporting arm and a riveting apparatus mounted thereon;

Fig. 2 is a horizontal section, the section being taken as on the line 2—2 in Fig. 1;

Fig. 3 is a vertical section, the section being taken as on the line 3—3 in Fig. 1;

Fig. 4 is a horizontal section, the section being taken as on the line 4—4 in Fig. 3.

Description.

As seen in the drawings, a frame having horizontal disposed grooved rails 9 and tie rods 10, is provided at suitable locations with magnets 11 supported in housings 12. The housings 12 are movably mounted on plates 13, which are grooved to engage overhanging rail extensions 14 on the outer sides of the rails 9. The disposition of the housings 12 on the plates 13 is controlled by a screw having a manipulating head 15 disposed to be engaged by the mechanic in charge. The construction, arrangement and coöperation of the magnets 11, housings 12, plates 13, and screw having the head 15, are shown and explained in a co-pending application filed September 16, 1918, bearing Serial No. 254,384, to which application cross reference is here made.

For the purpose of the present disclosure, it need only be understood that the magnets 11 are of any suitable type, which may be energized to magnetically engage the plates 16, to be united by rivets 17, and that the current needed for energizing the said magnets may be continued or discontinued at will.

Engaging the grooves in the rails 9, to be controlled thereby, is a second frame having vertical rails 18 and short horizontal rails 19, the latter having overhanging rail extensions 20 for engaging the grooves 21 in the rails 9. As seen best in Fig. 4 of the drawings, the rails 18 have undercut slots engaged by the overhanging rail extensions 22 of the riveter and dolly frames 23. The frames 23 have a tubular turret-like extension wherein are slidably mounted adjusting plates 24. The plates 24, as best seen in Fig. 1 of the drawings, have tenon extensions 25 disposed in suitable grooves formed in the sides of the frames 23. The plates 24 have recesses 26 into which extend the rings 27 to which are attached recoil springs 28. The rings 27 are rigid on the cylinder 29 of the riveter and on the dolly bar 30. Fixedly attached to the plates 24 are anchor rings 31 by which the springs 28 are held.

When in the course of operation the hammer 32 of the riveter or the dolly bar of the dolly rebounds from the impact of the hammer on the rivet 17 being headed, the cylinder 29 and bar 30 are permitted to move expanding the pull springs 28 in the course of such movement. The springs 28 are sufficiently strong to immediately return said cylinder and bar and the rings 27 connected therewith to their normal seat at the inner ends of the recesses 26. The plates 24 are also employed for advancing and retracting the normal inactive position of the dolly bar 30 and hammer 32.

To move the plates 24 to the inactive position referred to, the U-shaped swinging levers 33 are engaged by the heads 34 extended from the plungers 35. The plungers 35 are reciprocatively mounted in auxiliary cylinders 36 and are moved therein by compressed air delivered by the supply pipes 37. The pipes 37 have each a valve 38, which is controlled by a trigger 39, the depression of which opens the valve to permit air to enter the chamber of the cylinder 36 and so

move the plunger 35 and head 34 thereof to rock the levers 33 on their pivots 40. The levers 33 are connected by links 41 to the plates 24.

The triggers 39 are disposed adjacent the handles 42 with which the riveter and dolly are provided. Adjacent the handle 42 in the riveter is a trigger 43, which operates a valve 44 on the compressed air supply pipe 45, which enters the chamber 46 of the cylinder 29 by the port 47, as seen best in Fig. 3 of the drawings.

When compressed air is admitted to the chamber 46, it forces the flanged head 48 and the hammer 32 integral therewith outward from the said chamber 46, causing the head of the hammer to strike the rivet 17 as the head 48 passes the port 49, the pressure is reduced to permit the spring 50 which surrounds the hammer to return the hammer and the head 48 thereof to its seat until the pressure in the chamber 46 is reestablished to drive the hammer 32 to its work.

From the foregoing it will be seen that when employing a riveting apparatus as herein described, the larger frame having the rails 9 is first adjusted to the area to be operated upon. The smaller frame is then adjusted within the area covered by the larger frame. The frames 23 carrying the riveter and dolly are then adjusted within the smaller frames to dispose the hammer 32 and dolly bar 30 in coöperating positions.

It will be understood that the frames above mentioned are duplicated and are disposed at opposite sides of the plates 16 to be united by rivets 17. These frames are independently disposed, each being provided with lanyards 51 by means of which they are lowered to approximate working positions.

Before the frames 23 are arranged as described, a rivet 17 has been heated to a degree which would permit the same being headed. The means employed for heating the rivets is preferably electrical, employing for that purpose, terminal contact blocks 52, flexible conductors 53, and insulating handles 54, which are equipped with switch plugs 55 for inaugurating or discontinuing the current supply. The blocks 52 are normally pressed against the ends of the rivets 17 by springs 56. The said blocks are rigidly connected with and swing on links 57, which pivot on pins 58 shown in Fig. 3 of the drawings. The bolts 59 are permanently attached to the blocks 52 and are engaged by the operator when attracting said blocks after the current supply has been discontinued. By reference to Fig. 3 of the drawings, it will be seen that the links 57 are so arranged that the blocks 52 rest on a rivet 17 when the dolly bar 30 and hammer 32 rest on an adjacent rivet. By means of this arrangement, the rivet to be next headed is heated at the same time that the rivet next to it is being headed, so that each time the apparatus is shifted, the hammer 32 and dolly bar 30 are employed in heading a rivet while the blocks 52 and electric circuit connected therewith are employed in heating an adjacent rivet.

The frames 23 and the frames having the rails 18 are manually moved, each frame 23 being locked on the rails 18 by means of the cam head 59. The cam head 59 is moved by means of the handle 60.

When provided with an apparatus constructed and arranged as above described and as shown in the accompanying drawings, the operation is as follows: By means of the lanyards 51, the larger frame is disposed opposite the area to be operated upon. Current is then supplied to the magnets 11, which engage and hold the frame having the rails 9 in position, until the rivets for holes contained within the area bounded by the larger frame have been treated and headed. The larger frame is then shifted by discontinuing the electric current in the magnets 11, permitting the same to become deënergized so that the frame may be removed from the plates 16, and by means of the lanyards 51, transferred to an adjacent area. When the shifted position of the frame has been proximated, current is supplied to the said magnets and the frame thereafter is held fixedly on the plates 16.

Claims.

1. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; and means connecting said frame and tool, said means being adapted for cushioning said tool in the outward movement thereof.

2. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; and means connecting said frame and tool, said means being adapted for cushioning said tool in the outward movement thereof, said means embodying a movable frame for supporting said tool, and springs disposed intermediate said frame and tool for normally maintaining said tool advanced in said frame to the working position of said tool.

3. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; means connecting said frame and tool, said means be-

ing adapted for cushioning said tool in the outward movement thereof, said means embodying a movable frame for supporting said tool, and springs disposed intermediate said frame and tool for normally maintaining said tool advanced in said frame to the working position of said tool; and means manually controlled for advancing the working position of said tool.

4. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; means connecting said frame and tool, said means being adapted for cushioning said tool in the outward movement thereof, said means embodying a movable frame for supporting said tool, and springs disposed intermediate said frame and tool for normally maintaining said tool advanced in said frame to the working position of said tool; and power-actuated means for advancing the working position of said tool.

5. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; means connecting said frame and tool, said means being adapted for cushioning said tool in the outward movement thereof, said means embodying a movable frame for supporting said tool, and springs disposed intermediate said frame and tool for normally maintaining said tool advanced in said frame to the working position of said tool; and manually controlled pneumatic means for advancing the working position of said tool.

6. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; means connecting said frame and tool, said means being adapted for cushioning said tool in the outward movement thereof, said means embodying a movable frame for supporting said tool, and springs disposed intermediate said frame and tool for normally maintaining said tool advanced in said frame to the working position of said tool; and manually controlled pneumatic means for advancing the working position of said tool, said means embodying a rocking lever connected with said tool, and a pneumatically actuated power mechanism embodying a cylinder, and a movable plunger therein, said plunger being operatively connected with said lever.

7. An apparatus as characterized comprising a movable supporting frame; means for guiding said frame over an operative area; a pneumatically operated reciprocating tool mounted in said frame; means connecting said frame and tool, said means being adapted for cushioning said tool in the outward movement thereof, said means embodying a movable frame for supporting said tool, and springs disposed intermediate said frame and tool for normally maintaining said tool advanced in said frame to the working position of said tool; and manually controlled pneumatic means for advancing the working position of said tool, said means embodying a rocking lever connected with said tool, and a pneumatically actuated power mechanism embodying a cylinder, a movable plunger therein, said plunger being operatively connected with said lever, and a manually controlled valve for admitting air to said cylinder at will.

8. An apparatus as characterized comprising a pair of movable supporting frames adapted to be positioned on opposite sides of the work; means for guiding said frames over operative areas; pneumatically operated tools mounted in the respective frames; and means connecting said frames and tools, said means being adapted for cushioning said tools in the outward movement thereof.

9. An apparatus as characterized comprising a pair of movable supporting frames adapted to be positioned on opposite sides of the work; means for guiding said frames over operative areas; pneumatically operated tools mounted in the respective frames; means connecting said frames and tools, said means being adapted for cushioning said tools in the outward movement thereof; and an electric preheating apparatus mounted on said tools, said apparatus embodying electric conductors and block terminals therefor, one conductor and one block terminal being pivotally attached to each of said tools.

10. An apparatus as characterized comprising a pair of movable supporting frames adapted to be positioned on opposite sides of the work; means for guiding said frames over operative areas; pneumatically operated tools mounted in the respective frames; means connecting said frames and tools, said means being adapted for cushioning said tools in the outward movement thereof; an electric preheating apparatus mounted on said tools, said apparatus embodying electric conductors and block terminals therefor, one conductor and one block terminal being pivotally attached to each of said tools; and spring-actuated means for holding said block terminals in contact with the extremities of a bolt when in position to be heated.

11. An apparatus as characterized comprising a pair of movable supporting frames adapted to be positioned on opposite sides of the work; means for guiding said frames over operative areas; pneumatically operated tools mounted in the respective frames; means connecting said frames and tools, said means being adapted for cushioning said tools in the outward movement thereof; an

electric preheating apparatus mounted on said tools, said apparatus embodying electric conductors and block terminals therefor, one conductor and one block terminal being pivotally attached to each of said tools; spring-actuated means for holding said block terminals in contact with the extremities of a bolt when in position to be headed; and a plurality of switches for said conductors, one on each of said conductors, to be manually operated by the attendant in charge of each of said tools.

EDGAR T. REYNOLDS.