No. 719,242. PATENTED JAN. 27, 1903.

G. E. MARTIN.

RIVETING MACHINE.

APPLICATION FILED DEC. 21, 1901.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 2

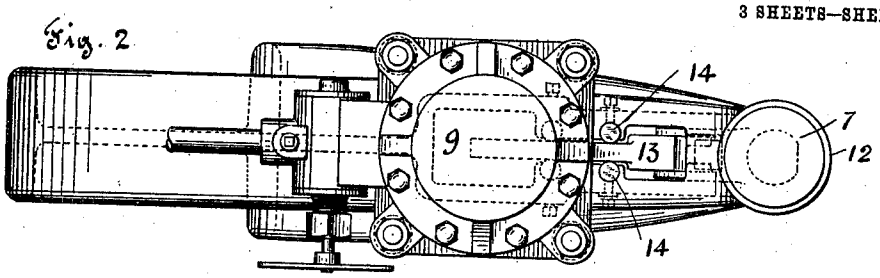
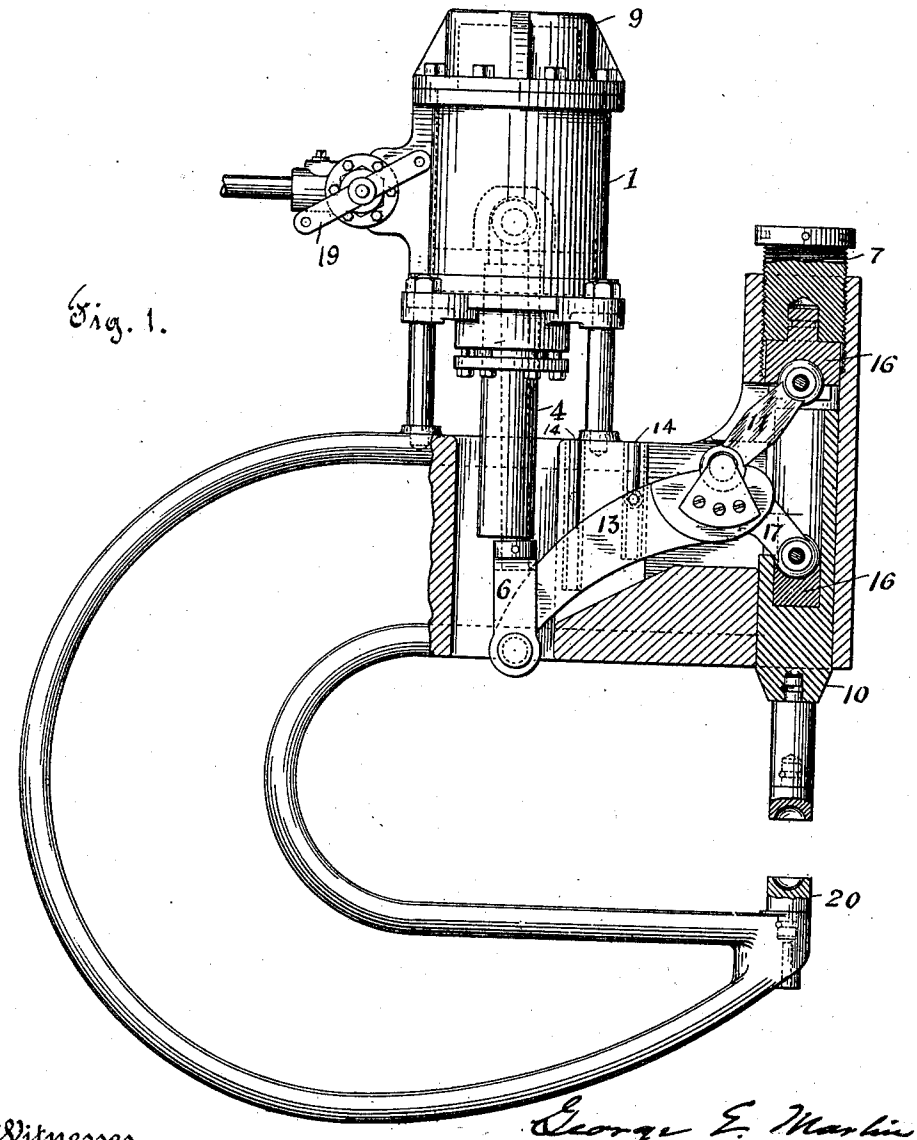


Fig. 1.



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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 4.

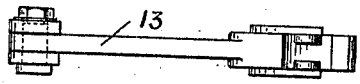
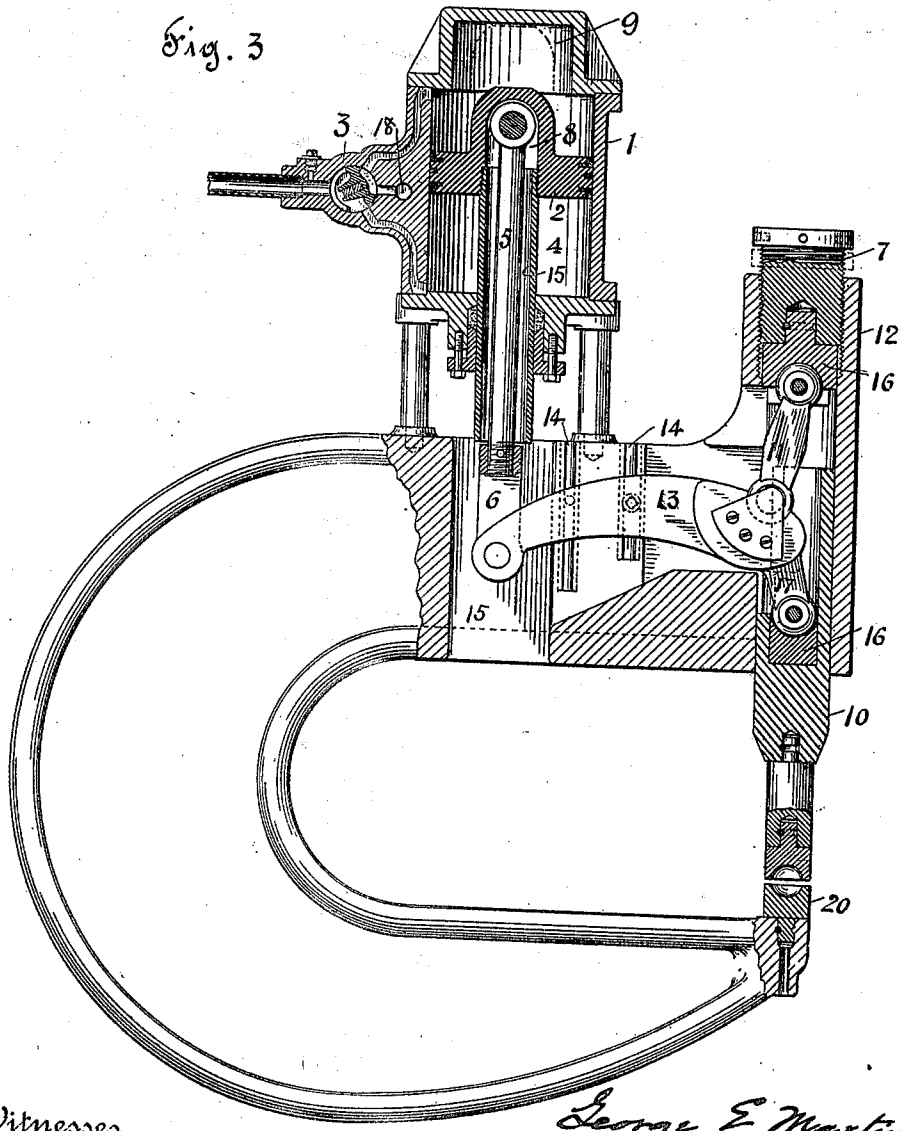


Fig. 3



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

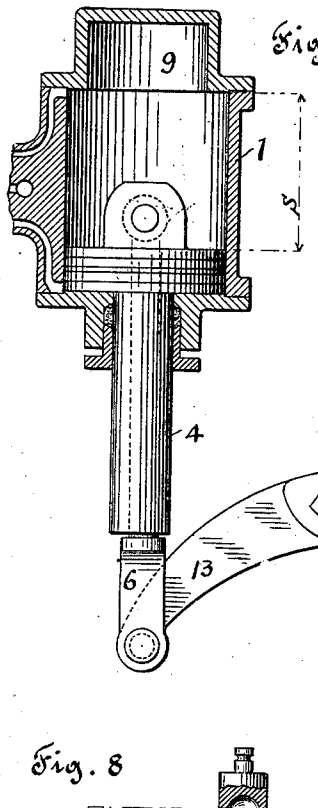


Fig. 6.

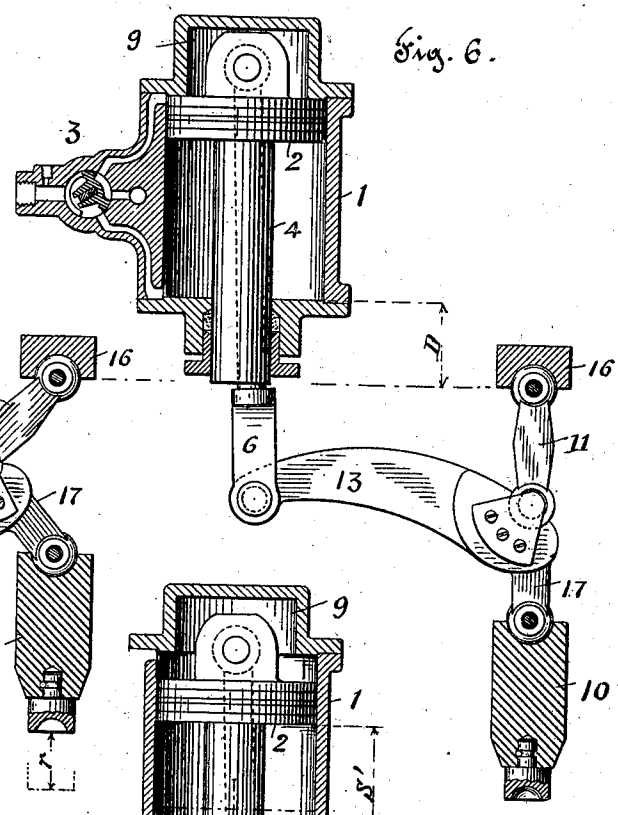


Fig. 8

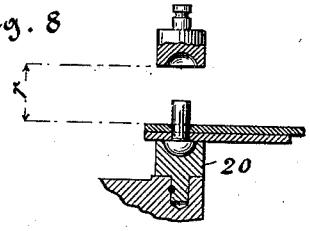


Fig. 9.

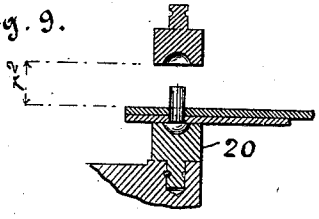


Fig 10.

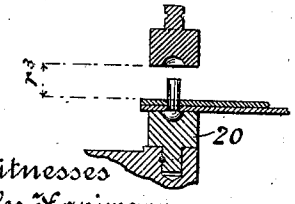
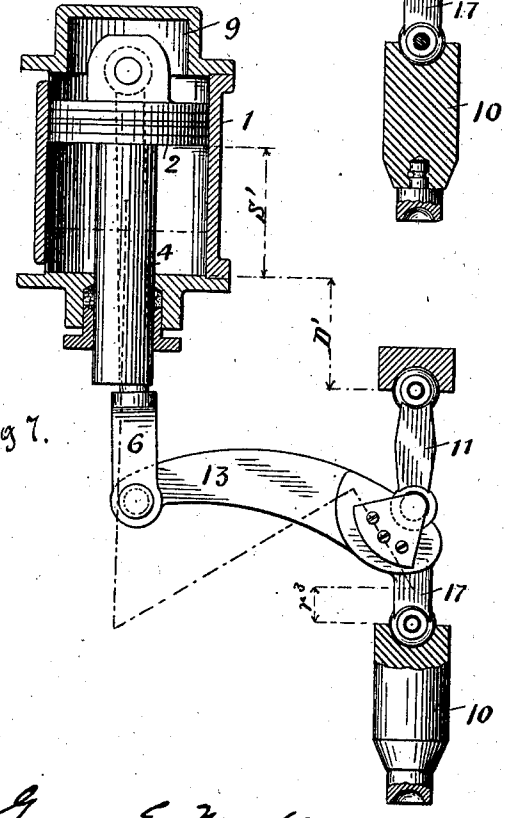


Fig 7.



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UNITED STATES PATENT OFFICE.

GEORGE E. MARTIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PEDRICK AND AYER COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 719,242, dated January 27, 1903.

Application filed December 21, 1901. Serial No. 86,733. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. MARTIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Riveting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in portable riveting-machines; and it consists in a novel relative arrangement of the operative parts, all as hereinafter set forth.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation, partly in section, showing the relative arrangement of the power-cylinder, transmitting mechanism, and connected riveting-plunger; Fig. 2, a top or plan view of the same; Fig. 3, a sectional elevation of all the operative parts in relative position of action upon the rivet; Fig. 4, a top view of the power-lever detached; Figs. 5 and 6, diagrammatic views of the operative parts detached, showing the extreme positions of the same at the full stroke of the power-piston; Fig. 7, a similar view showing a relative position of the parts when adjusted to a more limited stroke, and Figs. 8, 9, and 10, diagrammatic views of the riveting devices with rivets of varying size and plates in relative position corresponding with the variable travel of the riveting-plunger.

Similar numerals of reference in the several figures denote corresponding parts.

1 is the power-cylinder, 2 its reciprocating piston, and 3 a valve device for regulating the admission and release of the pressure medium.

The piston 2 is a "trunk" type, with its trunk 4 and its pivoted rod 5 connected thereto, the latter projecting at its opposite end below the trunk and connected at an extension part 6, that communicates motion to the operating-lever 13.

The piston 2 is constructed with a central hollow part 8, that projects from its face side and in which the rod 5 is journaled. At the top of the cylinder a bonnet 9 is provided to accommodate the central projecting part of the piston in its extreme upward movement and which serves the purpose of a dash-pot to cushion the piston on its upward stroke.

The riveting-plunger (represented at 10) is reciprocated by means of the rocking lever 13 and fulcrum-link 11, the lever being coupled with the extension-rod 6 of the piston-rod 5 and journaled directly to the riveting-plunger 10, and the fulcrum-link 11 to the lever 13 and to the stationary part 12 on the frame, the movement of the link and extension 17 of the lever being similar to the operation of toggle-levers. The lever 13 and its arm 17 are made integral, and a socket is provided to form a bearing for the fulcrum-lever 11, side plates being fastened to the lever and covering the journal of the lever 11 to maintain it in line with the lever 13, as shown in Figs. 1, 3, 4, 6, and 7.

The connection between the power-piston rod and the riveting-plunger is made directly with the rocking lever 13, which is journaled respectively thereto at its opposite ends and practically upon a horizontal plane, the upward stroke of the power-piston moving the rocking lever and the fulcrum-link 11 into the line of movement of the plunger and the return stroke out of line therewith to effect the forward and return motion of the plunger, which will be readily understood by an inspection of the various figures in the drawings.

The parallel arrangement of the movement of the power-piston and riveting-plunger in this invention when compared with machines of this kind in which the power-cylinder is arranged in a line transverse or at an angle to the vertical line of movement of the riveting-plunger is one of the important features of my invention.

The friction caused by a different alinement of the movement of the parts that produce and apply the power is rendered practically *nil* by my invention, wherein it is confined to the rotating journals of the intermediate mechanism. This intermediate mechanism is located in a chamber constructed within the frame, the fulcrum-link 11 swinging clear and the rocking lever 13 relieved by steel guides 14, placed in the adjacent sides of the frame, as shown in Figs. 1, 2, and 3. The connection of the lever 13 with

the extension 6 and piston-rod 5 moves in the opening 15 clear of the trunk 4 and the frame. The end bearings 16 of the lever 13 and fulcrum-link 11 are made of blocks of steel and secured, respectively, in recesses provided in the riveting-plunger 10 and the opposite adjustable plug 7, as shown in Figs. 1 and 2.

The plug 7 is adjusted vertically by means of its threaded exterior for the purpose of varying the travel or throw of the riveting-plunger when operating upon rivets of various sizes and lengths and which also varies the stroke of the power-piston.

The end of the stroke of the riveting-plunger 10 is always determined by setting the riveting-die upon the plate and bringing the link 11 to a vertical line by means of the adjustable plug 7. When the plug 7 is at its highest point of adjustment, the riveting-plunger 10 and power-piston 2 are given full stroke, and at lower points of its adjustment the stroke of both the plunger and piston is shortened.

The reduced stroke of the riveting-plunger and consequent reduced stroke of the power-piston effects a saving in the consumption of the pressure medium.

The variation in the travel of the riveting-plunger is shown in the diagrammatic views, Figs. 8, 9, and 10, in the relative distance apart of the riveting-die and rivet at the extreme vertical position of the riveting-plunger in each instance.

The connection of the rocking lever 13 with the fulcrum-link 11 is made to effect a progressive increase in the applied force upon the riveting-plunger 10, due to the movement of the lever 13 by the power-piston and the change in the position of the fulcrum of the link as it approaches the vertical position. (Shown relatively in Figs. 5 and 3 of the drawings.)

The operation of the machine will be readily understood from an inspection of the drawings, the plates to be riveted being placed, with the rivet inserted, resting upon the riveting-anvil 20, as shown in Figs. 8, 9, and 10. The operating-valve 3 is turned to the position shown in Fig. 3, admitting the working fluid, which acting upon the under side of the power-piston 2 forces it upward and moving the connected rocking lever 13 therewith, which in turn acts to move the fulcrum-link 11 toward a vertical position, together with the extension 17 of the lever 13, and thus forcing the plunger 10 upon the end of the rivet. During this forward or operating stroke of the power-piston 2 the pressure from the preceding return stroke of the piston passes out through the valve to the exhaust-passage 18 to the atmosphere. The valve 3 is operated by means of the vibrating arm 19 to admit and release the pressure from the respective sides of the power-piston at each stroke in the usual way.

The invention is shown in connection with a portable machine, but may be adapted to a fixed or stationary one and operated by pneumatic or other power.

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

1. The combination in a riveting-machine of a power cylinder and piston; a reciprocating riveting-plunger, and adjustable mechanism connecting said piston and riveting-plunger, said mechanism comprising provision in virtue of which the stroke of the power-piston and riveting-plunger may be varied, as set forth.

2. The combination in a riveting-machine of a power cylinder and piston, and piston-rod, a reciprocating riveting-plunger and a rocking lever connecting with the piston-rod and riveting-plunger and also with an adjustable fulcrum-link, whereby the throw of the piston and riveting-plunger is made variable, as set forth.

3. The combination with the rocking lever 13, of the guides 14 arranged in the range of movement of said lever, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. MARTIN.

Witnesses:
ROBERT A. RUTHERFORD,
J. HARRY COOK.