J. C. VAN HAAGEN.

AUTOMATIC HEATER AND HOLDER-ON FOR RIVETS FOR RIVETING PURPOSES.

APPLICATION FILED DEC. 17, 1919.

1,358,900.

Patented Nov. 16, 1920.

2 SHEETS—SHEET 1.

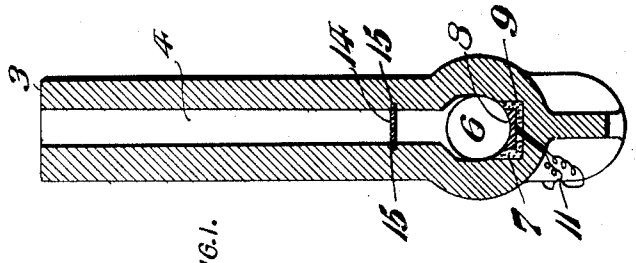

FIG. 3.
ON LINE 3-3. FIG. 1.

FIG. 2.
ON LINE 2-2. FIG. 1.

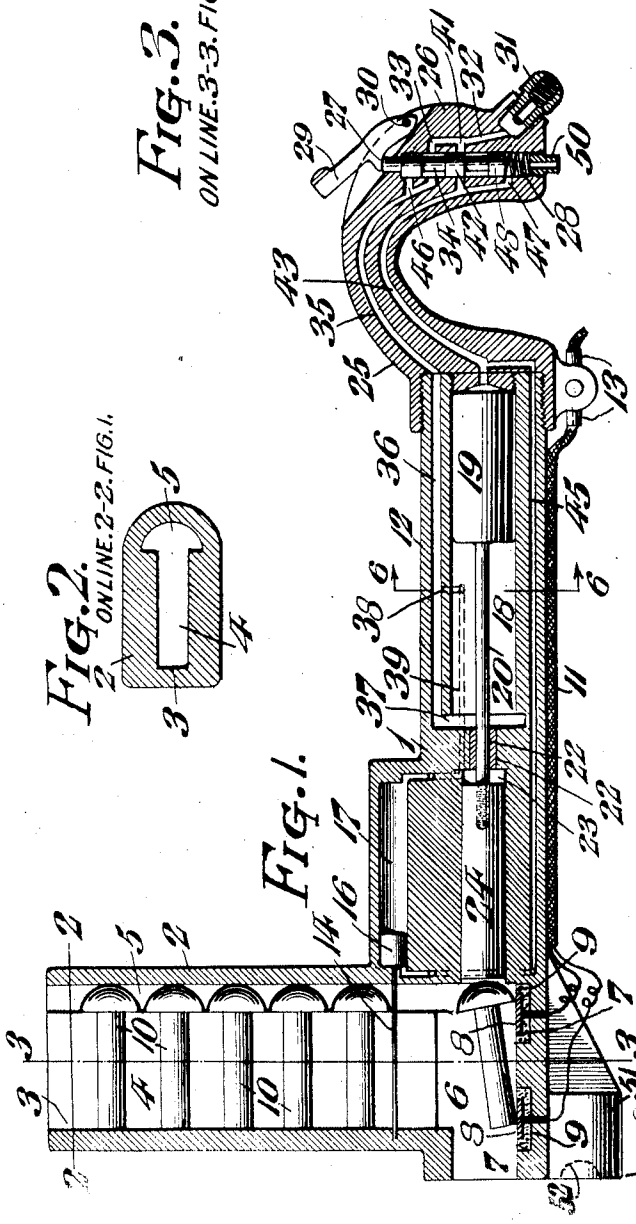

FIG. 1.

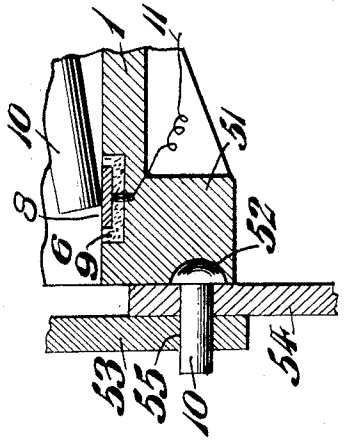

FIG. 4.

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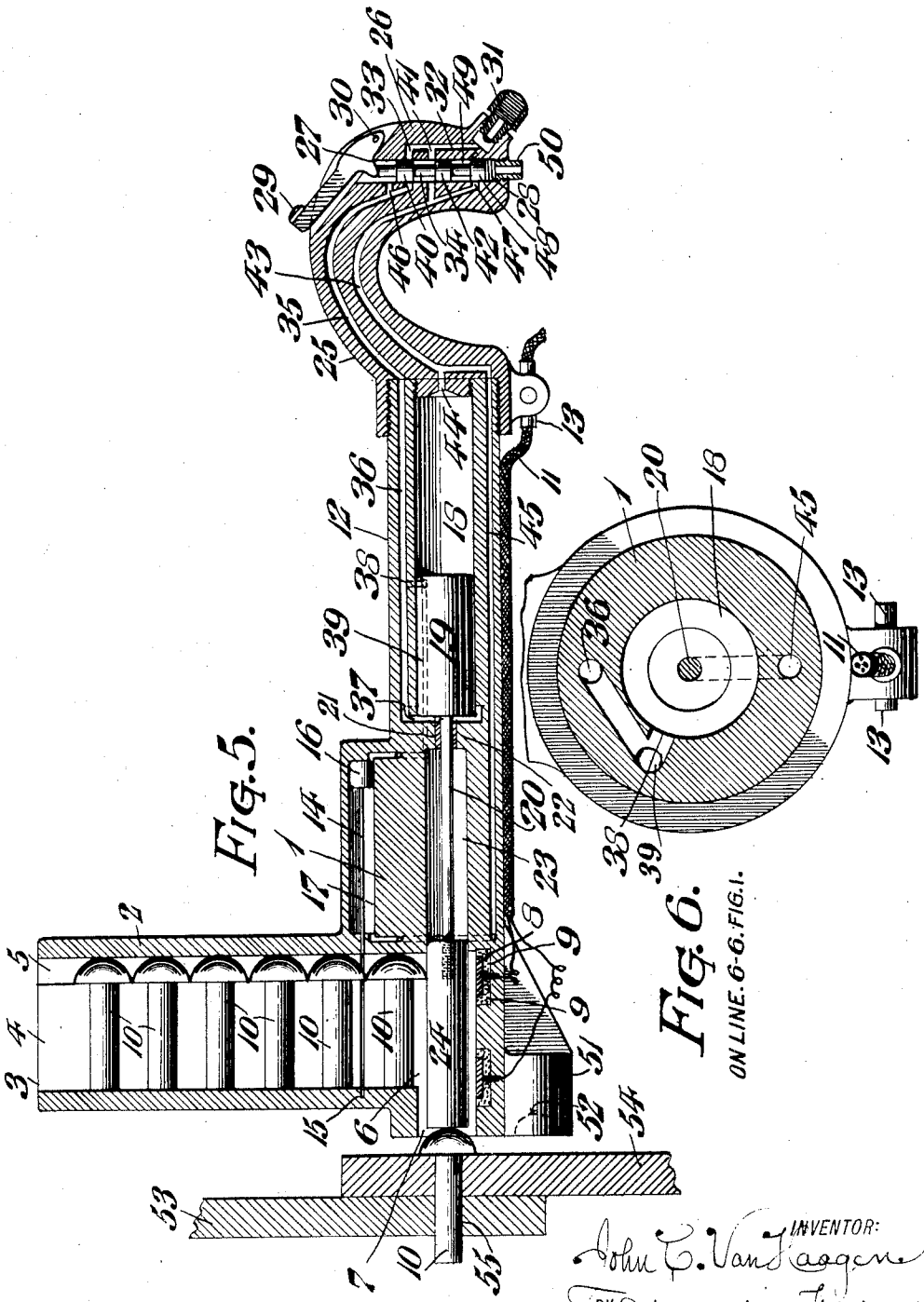

FIG. 5.

FIG. 6.

ON LINE 6-6 FIG. 1.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC HEATER AND HOLDER-ON FOR RIVETS FOR RIVETING PURPOSES.

1,358,900. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed December 17, 1919. Serial No. 345,559.

To all whom it may concern:

Be it known that I, JOHN C. VAN HAAGEN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Automatic Heater and Holder-On for Rivets for Riveting Purposes, of which the following is a specification.

In the art of driving rivets by means of pneumatic or other riveting devices, it has heretofore been the practice to heat the rivets to the proper degree then pass the rivets to the holder-on who places the rivet in its proper hole and then backs up the rivet during the driving operation by means of a dolly bar, (old-man) or a pneumatic holder-on, the loss of rivets by the passing or throwing of the same being often occasioned.

My present invention comprehends a novel construction and arrangement of a combined heater and holder-on wherein the rivets to be driven are heated to a desired temperature and are then forced into the hole in the two plates which are to be riveted together, after which the device is employed as a holder-on to back up the rivet during the driving operation, while the loss of rivets is avoided.

It further comprehends a novel construction and arrangement of a holder-on, a novel construction of a rivet retainer, novel means for controlling the automatic feed of the rivets to the heating device and a novel construction and arrangement of a heating device.

It further comprehends novel controlling mechanism for various features of the invention.

Other novel features of construction and advantage will hereinafter appear in the detailed description.

For the purpose of illustrating my invention, I have shown in the accompanying drawings a typical embodiment of it which illustrates the principle of the invention and will give in practise satisfactory and reliable results. It is, however, to be understood that this embodiment is typical only and that the various instrumentalities of which my invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of these instrumentalities as herein set forth.

Figure 1 represents, in sectional elevation, a rivet heater and holder-on, embodying my invention.

Fig. 2 represents a section on line 2—2 of Fig. 1.

Fig. 3 represents a section on line 3—3 of Fig. 1.

Fig. 4 represents a sectional view of a portion of the forward end of the device in conjunction with two plates to be riveted and with the rivet in place.

Fig. 5 represents, in sectional elevation, the construction seen in Fig. 1 but showing certain of the parts in a different relation from each other from that seen in said figures and showing in addition a plurality of plates with a rivet in position.

Fig. 6 represents a section on line 6—6 of Fig. 1.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—

The casing 1 at its forward end is provided with an upwardly extending portion 2 which forms a rivet retainer and is provided with a vertically extending chamber 3 preferably conforming to the contour of the rivets which it is to receive. As shown, it is provided with a rectangular shaped chamber 4 to receive the shank of a rivet and such chamber 4 merges into an enlarged chamber 5 shaped to receive the head of a rivet, as will be understood by reference to Figs. 1, 2 and 5.

The chambers 4 and 5 communicate at their lower ends in a heating chamber 6, the forward end of which is open as at 7, 8 designates the heating units such as for example an electrode between which and the casing is interposed insulation 9. I preferably employ a plurality of heating units located in the bottom wall of the chamber 6 so that the shank of a rivet 10 will contact with one heating unit and the head of a rivet will contact with the other heating unit when it is permitted to drop into the heating chamber 6. The conductors 11 preferably pass along the barrel 12 of the casing which forms a grasping portion for the operator and such conductors 11 lead to a source of electric supply. The conductors 11 are secured with respect to the casing 1 in any desired manner and are provided with a controlling switch 13 of any desired type.

14 designates a slide which controls the feed of the rivets into the heating chamber

6, and this slide is guided in the slots 15 in the walls of the chamber 4. The slide 14 is connected to a plunger or piston 16 which travels in a piston chamber 17, and provision is made for admitting motive fluid to impact against the forward or rear head of the piston 16 in accordance with the direction in which it is desired to have the piston 16 travel. The barrel 12 of the casing is provided with a piston chamber 18 in which is mounted a piston 19 which is provided with a stem 20 which passes through a bushing 21 in a partition 22 which separates the piston chamber 18 from the plunger chamber 23 in which is mounted an ejector or plunger 24 connected to the forward end of the piston rod or stem 20.

The casing 1 has connected to it in any desired manner a handle 25 which as illustrated is in threaded engagement with it, and this handle is provided with a grasping portion 26 in which is located a throttle valve 27 against one end of which bears a spring 28. This throttle valve 27 is controlled by means of a throttle valve lever 29 which is pivoted at 30 in a slot in the grasping portion 26 of the handle and this throttle valve lever is adapted to be actuated by the thumb or hand of the operator.

The motive fluid which controls the movement of the pistons 19 and 16 is conducted to the tool by means of a flexible hose (not shown) which is connected to the nipple 31 in order to lead motive fluid to the passage 32. If the parts are in the position seen in Fig. 1, the motive fluid will pass from the passage 32 through the port 33 around the neck 34 of the valve and through passage 35 in the handle and passage 36 in the casing and will pass into the forward end of the piston chamber 18 through the port 37. The air from the passage 26 will also pass through the port 38 communicating with the passage 36 and through the passage 39 to the rear end of the piston chamber 17.

With the parts in the position seen in Fig. 1, the rivet ejector 24 is in its rearward position and the piston 16 and the slide 14 are in their forward position. When the operator presses downwardly the throttle valve lever 29 into the position seen in Fig. 5, the port 33 is closed by means of the head 40 of the throttle valve and port 41 is opened by means of the head 42 of the throttle valve and the motive fluid passes from the passage 32 through the port 41, passage 43 in the handle and port 44 into the rear end of the piston chamber 18, at the same time passing through passage 45 which communicates with the passage 43 and with the forward end of the piston chamber 17 so that the piston 19 and the piston 16 are moved into the position seen in Fig. 5.

During the forward movement of the piston 19 the exhaust takes place from the forward end of the piston chamber 18 through port 37, passage 36 in the casing, passage 35 in the handle and port 46 to the atmosphere, as at this time the head 40 has uncovered the port 46. The exhaust from the rear end of the piston chamber 17 takes place through the passage 39, port 48, passages 36 and 35 and port 46 to the atmosphere.

When the parts are in the position seen in the Fig. 5, and the pistons and the parts are moved from the position seen in Fig. 5 into that seen in Fig. 1, exhaust takes place from the rear end of the piston chamber 18 through the port 44, passage 43 and port 47 to the atmosphere since at this time the head 48 of the piston has uncovered the port 47. The throttle valve 27 is slidable in a chamber 49 one end of which is closed by a plug 50.

The forward end of the casing 1 is provided with a boss or enlargement 51 in the forward face of which is formed a recess to receive the head of a rivet 10 and which preferably conforms to the contour of the head of a rivet.

53 and 54 designate respectively overlapping plates which are to be riveted and which are provided with an aperture 55 to receive the rivet.

The operation of my novel combined heater and holder-on will now be readily apparent to those skilled in the art to which this invention appertains and is as follows:

The operator fills the rivet retainer with rivets so that the magazine formed by the rivet retainer contains a desired number of rivets, it being understood that such magazine can be made large enough to accommodate any desired number of rivet blanks.

The operator now actuates the switch 13 to close the circuit in the heating units 8 and the rivet heater and holder-on are ready for operation, the parts being in the position seen in Fig. 1, except that a rivet 10 has not yet been fed into the heating chamber 6.

The operator now presses the throttle valve lever 29 forwardly from the position seen in Fig. 1 to that seen in Fig. 5. This permits the live motive fluid to pass from the passage 32 which is always open to the admission of live motive fluid through port 41 and passage 43 and port 44 into the rear end of the piston chamber 18 to cause the piston 19 and the ejector 24 to move forwardly into the position seen in Fig. 5. At the same time the live motive fluid passes from the passage 43 through the passage 45, into the forward end of the piston chamber 17 and causes the plunger 16 to move into the position seen in Fig. 5 whereupon the rivets in the magazine can be moved downwardly so that the lowermost rivet

will rest on the ejector or plunger 24. The operator now releases his pressure on the throttle valve lever 29 and the spring 28 returns the throttle valve 27 into the position seen in Fig. 1 thereupon causing the piston 19 and the ejector 24 to move rearwardly as before described and the piston 16 and the slide 14 to move forwardly into the position seen in Fig. 1 and a rivet blank is now resting on the heating units 8.

As soon as the rivet blank is heated to the desired temperature, the operator holds the combined rivet heater and holder-on in such a position that the heated rivet blank can pass from the heating chamber 6 through the discharge end 7 of such chamber into the hole 55 in the overlapping plates 53 and 54 which are to be riveted.

The operator now presses forwardly on the throttle valve lever 29 thereby causing the ejector 24 to move forwardly as will be understood by reference to Fig. 5 and the rivet blank will be forced into the hole 55 in the plates. The operator next relieves his pressure on the throttle valve lever 29, thereby causing the ejector 24 to move rearwardly and the slide 14 to move forwardly so that a rivet blank is automatically discharged into the heating chamber 6. While such rivet blank is being heated, the operator backs up the rivet blank which has previously been inserted in a hole 55 by bringing the recess 52 into register with the head of the rivet blank which has been inserted in place, and he holds the holder-on in such a position that during the driving of the rivet it will be properly backed up.

While the device is being used as a holder-on it will be apparent that another rivet blank is being heated so that as soon as one rivet has been driven another rivet blank which has been heated may be inserted into position to be driven with a minimum amount of labor and expense.

In accordance with my present invention, the number of men employed in driving rivets is reduced, since I dispense with the rivet heater and the rivet passer, so that it is necessary to employ but two people in the driving of the rivet, one of whom drives the rivet and the other controls the heating of the rivets and backs them up during the driving operation and loss of rivets in throwing or passing as heretofore is avoided.

It will therefore be apparent that by the employment of my present invention the cost of heating and driving the rivets is reduced.

In so far as I am aware, I am the first in the art to devise a machine wherein the rivets are contained in a magazine and under the control of the operator are fed to the heating chamber and ejected therefrom directly into the hole or aperture into which they are to be driven and I therefore desire to have my claims to such features receive the interpretation to which a generic invention is entitled.

It will now be apparent that I have devised a new and useful automatic heater and holder-on for rivets for riveting purposes which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that such embodiment is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. A rivet heater and holder-on, comprising a casing having a rivet magazine chamber and heating means to which the rivets are fed from said chamber, a plurality of pistons adapted to reciprocate in said casing, one of said pistons controlling the feed of rivets from said chamber and the other controlling the ejection of a heated rivet, a grasping handle connected to said casing, ports and passages in said casing and handle to admit motive fluid to actuate said pistons, and means for controlling the admission of said motive fluid.

2. A rivet heater and holder-on, comprising a casing having a magazine chamber to receive the rivets and a heating chamber communicating with such magazine chamber, heating units in said heating chamber, conductors leading to said heating units, a switch supported with respect to said casing, means to control the passage of a rivet from said magazine chamber into said heating chamber, and means to eject a heated rivet from said heating chamber.

3. A rivet heater and holder-on, comprising a casing having a magazine chamber to receive the rivets and a heating chamber communicating with such magazine chamber, heating units in said heating chamber, conductors leading to said heating units, a switch supported with respect to said casing, means to control the passage of a rivet from said magazine chamber into said heating chamber, means to eject a heated rivet from said heating chamber, and said casing having means at its forward end to back up a rivet during the driving operation.

4. A rivet heater and holder-on, comprising a casing having a magazine chamber and a heating chamber communicating with it, a slide between said chambers to control the feed of the rivet from said magazine chamber, means to actuate said slide, heat-

ing units in said heating chamber, means to conduct electricity thereto, an ejector adapted to pass into said heating chamber to eject a heated rivet therefrom, and means to actuate said ejector.

5. A rivet heater and holder-on, comprising a casing having a magazine chamber shaped to receive the rivets and a heating chamber communicating with the magazine chamber, a slide adapted to support the rivets in the magazine chamber, a piston to control said slide to permit a rivet to feed from said magazine chamber into said heating chamber, heating means in said heating chamber, and a fluid controlled ejector to eject the rivets from said heating chamber.

6. A rivet heater comprising a casing, a handle secured to said casing, a rivet receiving magazine chamber secured to the forward portion of said casing, a heating chamber communicating with said rivet receiving magazine chamber, means within said casing for controlling the gravity feeding of the rivets from the magazine chamber to the heating chamber, an ejector adapted to eject a heated rivet from said heating chamber, and means for actuating said ejector.

7. A rivet heater comprising a casing, a handle secured to said casing, a rivet receiving magazine chamber secured to the forward portion of said casing and angularly disposed with relation thereto, a heating chamber communicating with the rivet receiving magazine chamber, means for controlling the gravity feeding of the rivets from the rivet receiving magazine chamber to the heating chamber, an ejector adapted to eject a heated rivet from said heating chamber, a plurality of pistons within the casing adapted to operate the gravity rivet feeding mechanism and the ejector, and means for operating the above-mentioned pistons.

8. A rivet heater comprising a casing, a rivet feeding magazine secured to said casing, a heating chamber secured to said rivet feeding magazine, said rivet feeding magazine and heating chamber being so arranged with relation to each other that upon the successive feeding of the rivets from said rivet feeding magazine to the heating chamber they will be subjected to increasing heat, and means for controlling the ejection of the rivets.

9. A rivet heater comprising a casing, a rivet feeding magazine secured to said casing, a heating chamber secured to and communicating with the rivet feeding magazine; said rivet feeding magazine and heating chamber being so positioned with relation to each other that upon the successive feeding of the rivets from the rivet feeding magazine to the heating chamber they will be subjected to increasing heat, means for retarding the successive feeding of the rivets from the rivet feeding magazine to the heating chamber, and an ejector within the casing and adapted to eject a heated rivet from said heating chamber.

10. A rivet heater comprising a casing, a rivet feeding magazine secured to said casing, a heating chamber secured to and communicating with the rivet feeding magazine; said rivet feeding magazine and heating chamber being so arranged with relation to each other that upon the successive feeding of the rivets from the rivet feeding magazine to the heating chamber they will be subjected to increasing heat, and means within the casing for effecting the automatic feeding of a rivet from the rivet feeding magazine to the heating chamber, simultaneously with the ejection of a heated rivet from the heating chamber.

11. A rivet heater comprising a casing, a rivet feeding magazine secured to said casing, a rivet heating chamber secured to one end of said rivet feeding magazine, and means within said casing for effecting the synchronous ejection of a heated rivet from the heating chamber and the automatic admission of a rivet from the rivet feeding magazine to the heating chamber.

12. A rivet heater comprising a casing, a rivet feeding magazine secured to one end of said casing, a handle secured to the other end of said casing, a heating chamber at the base of said rivet feeding magazine, an ejector within said casing and adapted to eject a heated rivet from said heating chamber, and means for controlling the successive feeding of the rivets from the rivet feeding magazine to the heating chamber whereby the rivets are automatically lowered from said rivet feeding magazine to said heating chamber.

13. A rivet heater comprising a casing, a handle secured to said casing, a rivet feeding magazine secured to said casing and angularly disposed with relation thereto, a heating chamber at the lower end of said rivet feeding magazine, heating units within said heating chamber, means for retarding the successive feeding of the rivets from the rivet feeding magazine to the heating chamber, an ejector adapted to eject a heated rivet from said heating chamber, and means for simultaneously operating the ejector and the rivet retarding means.

14. A rivet heater comprising a casing, a rivet feeding magazine secured to one end of the casing, a handle secured to the other end of the casing, a heating chamber at one end of said rivet feeding magazine, heating units within said heating chamber, means within the rivet feeding magazine for controlling the successive feeding of the rivets

to successively hotter zones, means for ejecting a heated rivet from the heating chamber, means within the casing for effecting the feeding of a rivet from the rivet feeding magazine to the heating chamber simultaneously with the ejection of a heated rivet from the heating chamber, and means for controlling the admission of motive fluid to said casing.

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Witnesses:
JOHN A. WIEDERSHEIM,
N. BUSSINGER.