No. 706,155. Patented Aug. 5, 1902.

V. R. BROWNING.

RIVET HEATING AND DISTRIBUTING SYSTEM.

(Application filed Jan. 2, 1902.)

(No Model.) 2 Sheets—Sheet 1.

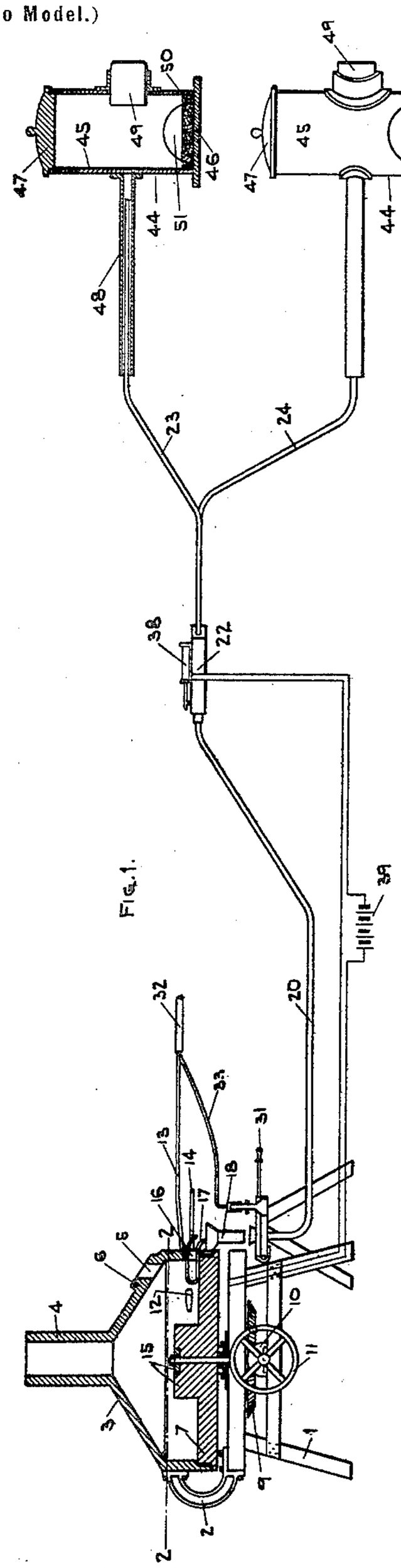

Fig. 1.

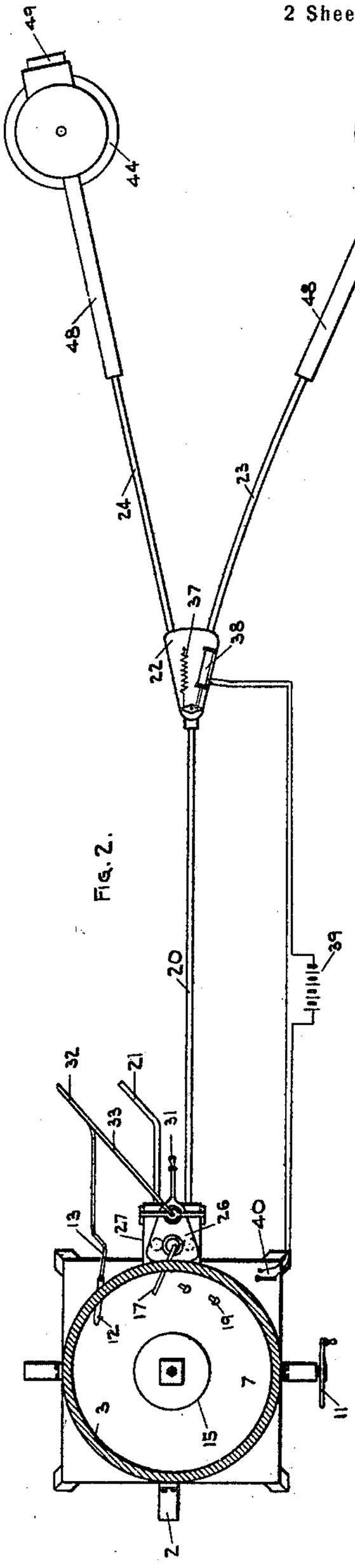

Fig. 2.

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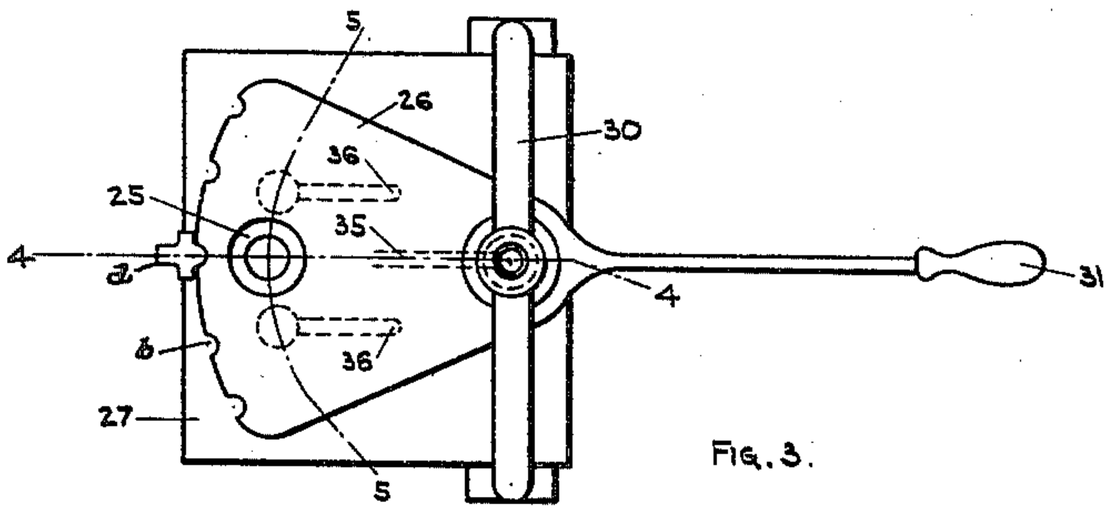

Fig. 3.

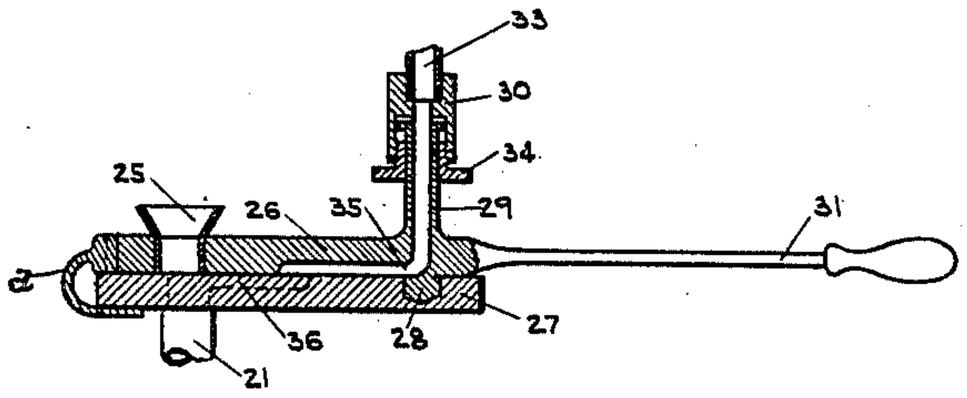

Fig. 4.

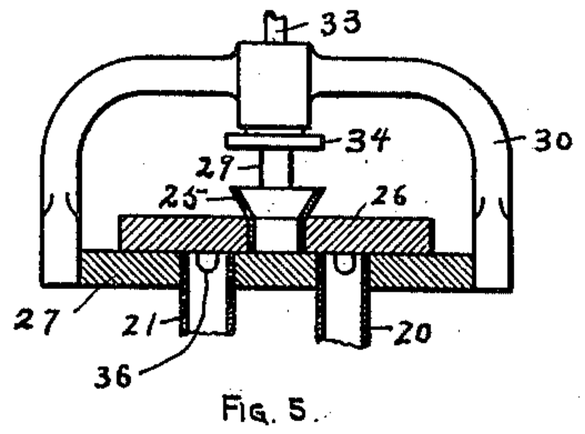

Fig. 5.

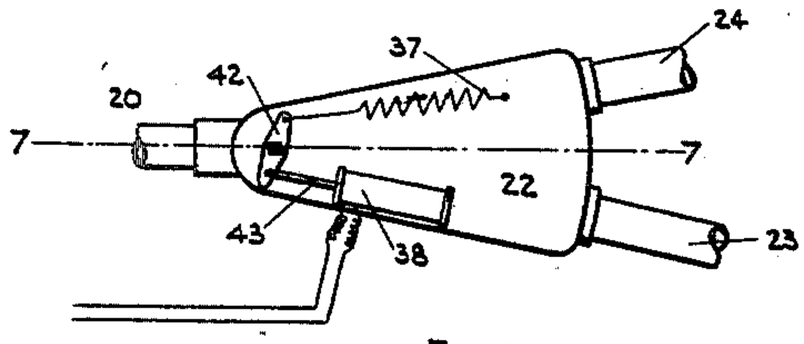

Fig. 6.

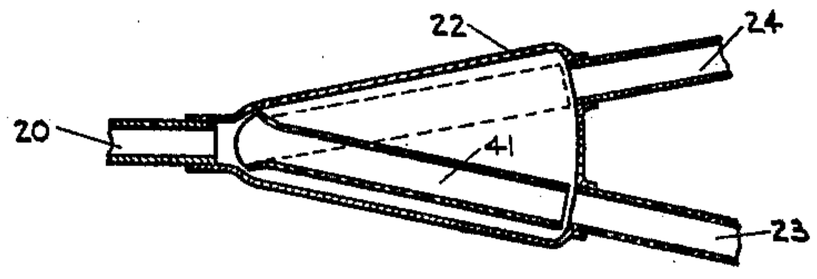

Fig. 8.

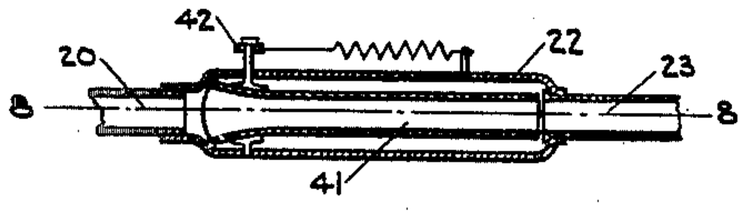

Fig. 7.

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UNITED STATES PATENT OFFICE.

VICTOR R. BROWNING, OF CLEVELAND, OHIO.

RIVET HEATING AND DISTRIBUTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 706,155, dated August 5, 1902.

Application filed January 2, 1902. Serial No. 88,023. (No model.)

To all whom it may concern:

Be it known that I, VICTOR R. BROWNING, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Rivet Heating and Distributing Systems, of which the following is a specification.

This invention relates to means for heating and distributing rivets and like articles, and has particular reference to the valve mechanism for controlling the compressed air for forcing the rivets through the distributing device to the receivers in which the rivets are deposited, to the switches for directing the rivets to any receiver desired, and to the furnace which automatically feeds the rivets to the distributing-pipes.

In the accompanying drawings, illustrating this invention, Figure 1 is a side elevation showing the general arrangement of the furnace and the distributing devices, parts of the furnace being broken away so that other parts may more clearly appear. Fig. 2 is a plan view of the device, the furnace being shown in section, taken on line 2 2 of Fig. 1. Fig. 3 is a plan view of the air-valve and its controlling-lever. Fig. 4 is a sectional view taken on the line 4 4 of Fig. 3. Fig. 5 is a sectional elevation taken on the curved line 5 5 of Fig. 3. Fig. 6 is a plan view of the switch-box. Fig. 7 is a sectional view through the switch-box, taken on the line 7 7 of Fig. 6; and Fig. 8 is a sectional view through the switch-box, taken on the line 8 8 of Fig. 7.

Heretofore in the erection of any machine or other structure where rivets are to be supplied it has been the practice to have a portable forge, which is carried about as the work progresses and from which the hot rivets are taken one at a time by boys with tongs and thrown toward the riveter. Sometimes these rivets are caught in a bucket or otherwise, from which they are taken for use. At other times and quite frequently they miss the bucket and fall below. In any event the rivet has time to cool to a considerable degree before it reaches the place where it is to be used, and when it drops below, as above stated, it endangers the workmen there.

My invention has a central stationary furnace in which the rivets are heated and from which they are automatically fed to the distributing-pipes. Through these pipes the rivets are driven by means of compressed air, steam, or other fluid to receivers, which are placed in positions where the rivets are to be used and from which they may be easily extracted. The rivets are blown through the pipes with great velocity, so that there is no time for them to cool, and as the pipes and receivers are directly connected it is impossible for them to drop out to endanger the workmen below.

In the drawings, in which similar reference characters designate corresponding parts throughout the several views, 1 represents the supporting parts for the furnace, upon which is secured the arm 2 for supporting the hood 3. This hood is preferably cylindrical in shape, as shown, with its upper part closed except at the center, where there is a stack or chimney 4, and at a point 5, where there is an inlet for the rivets. A funnel-shaped flange 6 projects above the hood and surrounds the inlet to receive and direct the rivets. Located below the lower rim of the hood and fitting the same closely is a rotating bed 7, which is turned by a vertical shaft. This shaft has on its lower end a bevel-gear 9, which meshes with a similar gear 10 on a horizontal shaft journaled in the supporting-frame for the furnace, and this shaft has a hand-wheel 11, by means of which it may be turned to rotate the bed.

While the furnace may be heated in any suitable manner, I prefer to employ the means shown, which consist of an injector 12, which passes through the wall of the hood 3 in a direction almost tangent to its inner periphery. Compressed air is forced into the injector through the pipe 13, which draws in oil from the pipe 14, and when this is ignited the flame will tend to sweep around the inner surface of the hood. This tendency is greatly facilitated by placing a cylindrical projection 15 on the bed 7 concentric with the inner part of the hood. Passing through the wall of the hood slightly to one side of the injector is an opening 16, through which the rivets pass from the furnace. Projecting through this opening and for some distance into the

furnace is a bent iron water-pipe 17, through which water is constantly forced to prevent the same from burning.

The opening 5 is so placed that the rivets are dropped slightly in front of the pipe 17, and as the bed is rotated they are kept directly in the line of greatest heat. When they reach the pipe 17, after the bed has turned practically once around, they are automatically scraped from the furnace by the pipe and drop into a spout 18, which conducts them to the distributing-pipes hereinafter described. The rivets in the furnace are indicated at 19.

From the furnace the rivets are driven by compressed air through the pipes 20 or 21 to the switch-boxes 22, from which they are distributed through the pipes 23 and 24 to any position where they may be required. They first drop from the spout 18 into a receiver 25, which is formed on the rocking valve 26, so that it may be brought under the spout at will. The valve is mounted upon a stationary supporting disk or seat 27, with which the pipes 20 and 21 are connected. The pipes communicate with the cup 25 through openings formed in the valve and the seat; but this communication may be broken and the end of the pipe closed by simply turning the valve, which is journaled at 28 in the seat. Rising from the center of the valve is a pipe-like stem 29, the upper end of which is journaled in a yoke 30, which is secured to the seat 27. The valve is rocked by means of a handle 31 connected thereto.

32 is a pipe which communicates with any suitable source of compressed air, said pipe branching into the pipes 13 for the furnace and 33 for the valve. This latter pipe screws into the upper part of the yoke 30 and communicates with the chamber in which the stem 29 of the valve is journaled. To prevent any leakage of air, a suitable packing-gland 34 surrounds the stem and screws to the yoke. As seen in Fig. 4, the stem 29 is hollow, and near its lower end this hollow branches out to form a port 35, which opens through the lower face of the valve. The valve-seat 27 has grooves or ports 36 cut in its face and leading into the pipes 20 and 21, the ports 35 and 36 being relatively so situated that when the valve is turned to certain positions they will register, and thus connect the compressed-air pipe 32 with either of the pipes 20 and 21.

When it is desired to furnish a rivet at any place in the system, the operator turns the hand-wheel 11 until a rivet drops out of the furnace, the valve 26 having been placed so that the cup or receiver 25 is under the spout 18 to catch it. The valve is then turned to bring the cup into register with the pipe 20 or 21, that leads in the proper direction, when the rivet will drop into the pipe. The operator then turns the valve to bring the port 35 into register with the port 36 of the pipe, when the air rushes in behind the rivet and drives it rapidly through the pipe to the point where it is to be used. In order to cause the cup 25 to register accurately with the spout and with the pipes 20 and 21 and also to cause the ports 35 and 36 to register when the valve is turned, I secure to the seat 27 a spring *a*, which is adapted to enter notches *b* in the outer edge of the valve-piece 26. With this system it is possible for one furnace and one operator to supply rivets for a number of gangs of riveters. The valve 26 furnishes the means for starting the rivet in any one of the main pipes 20 21; but it is desirable to subdivide these pipes into a plurality of distributing-pipes, as 23 and 24, so that the rivet may be fed to any part of a large structure. At the junction of these distributing-pipes it is necessary to place a switch, which should be under the control of the operator of the furnace. The boxes for these switches are indicated at 22 in Figs. 1 and 2, said figures also showing the spring 37 and solenoid 38 for controlling the switch. From the solenoid wires lead to a battery or other source of electric power 39 and to a controller 40, by means of which the operator can close the circuit through the solenoid to throw the switch or break the circuit to permit it to return to normal position. The switch which is shown in detail in Figs. 6 to 8, inclusive, consists simply of a short pipe 41, which is trunnioned near one end of the switch-box 22. One of the trunnions extends outside through the cover of the box and has secured to its upper end a switch-lever 42, to the opposite ends of which are secured the spring 37 and the core 43 of the solenoid. The switch-box is by preference slightly wedge-shaped, as shown, and the main pipe 20 or 21 enters it at the small end. At the large end there are a plurality of outlets, one for each of the distributing-pipes, and the free end of the switch is caused to swing back and forth to register with any one of the distributing-pipes desired. The pivoted end of the switch is flared or bell-shaped, so that no matter what may be the position of the switch it will never obstruct the entrance from the pipe 20. Normally the spring pulls the switch into the position shown in full lines in Fig. 8; but when the circuit is closed through the solenoid it pulls the switch into the position to register with pipe 24, as indicated in dotted lines.

The velocity of the rivet is dependent upon the air-pressure, but is at most times very high. For this reason it becomes necessary to provide some sort of special receptacle into which the rivets are deposited. This receptacle, which is shown in the general views at 44, consists of a cylindrical shell 45, which is secured to a bottom piece 46 and which is closed at its top by a removable cover 47. Projecting from the shell near its center is a long tubular sleeve 48, which is adapted to loosely receive the end of the distributing-pipe 23 or 24, so that it may be moved thereon to bring the receiver into the best position

for delivering the rivets. Diametrically opposite the end of the sleeve 48 a plug of wood or some other suitable resilient material 49 is mounted in the receiver to sustain the impact of the rivets, which bound back therefrom and finally drop into the sand 50, with which the bottom of the receiver is covered. To facilitate the extraction of the rivets from the receiver, the shell 45 is cut away on its opposite sides at 51, through which tongs may be inserted.

While I have shown and described my preferred form of device and what I regard as the best manner for operating the same, I desire it to be understood that the details both of construction and of operation may be varied without departing from my invention. Any fluid under pressure may be used instead of air, the furnace may be heated differently, and the distributing-pipes be multiplied to suit any requirement. As will be seen from Fig. 1, the spout 18 extends downwardly almost to the receiver 25, so that the rivets are not exposed to the open air as they are transferred from the furnace to the pipes. Owing to this structure and to the great rapidity with which the rivets are driven through the pipes there is no time allowed for the rivets to cool until they are deposited in the receptacles 44.

While the valve may be left in position for admitting the air to the pipes until the rivet has practically reached its destination, it is preferable and more economical to use the air at a high pressure and open the valve only momentarily, thus utilizing the expansive force of the air, which is sufficient to drive the rivet forward at the desired speed. I have found a pressure of sixty pounds to the square inch to be suitable under most conditions, but do not limit myself to the use of air at any particular pressure.

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

1. In a device of the character described, a pipe for conveying hot rivets that are in condition suitable for riveting, and means for creating a difference in fluid-pressure in said pipe on opposite sides of the rivet, so that it will be fed along in the pipe.

2. In a device of the character described, a pipe for conveying hot rivets that are in condition suitable for riveting, and a valve for admitting a fluid under pressure to said pipe behind the rivet to drive it through the pipe.

3. In a device of the character described, a pipe for conveying hot rivets that are in suitable condition for riveting, a valve through which a fluid under pressure may be admitted momentarily to the pipe behind the rivet and then cut off, so that the expansive force of the fluid may be utilized in driving the rivet, and means at the end of the pipe for receiving the rivet.

4. In a device of the character described, a main pipe for conveying hot rivets that are in condition suitable for riveting, means for creating a difference in fluid-pressure in said pipe on opposite sides of the rivet so that it will be fed through the pipe, a plurality of distributing-pipes connected with the main pipe, and a switch for directing the rivets from the main pipe into any distributing-pipe desired.

5. In a device of the character described, a main pipe for conveying rivets and like articles, means for creating a difference in fluid-pressure in said pipe on opposite sides of the rivet so that it will be fed through the pipe, a plurality of distributing-pipes connected with the main pipe, a switch for directing the rivets from the main pipe into any distributing-pipe desired, and receivers for the rivets adjustably connected with the distributing-pipes.

6. In a device of the character described, a pipe for conveying rivets by fluid-pressure, a valve for closing the pipe, an opening in the valve which may be brought into register with the pipe and through which a rivet may be inserted, connections with said valve whereby a fluid under pressure may be conducted thereto, and a port in the valve which is also adapted to be brought into register with the pipe so that the compressed fluid may enter to force the rivet through the pipe.

7. In a device of the character described, a main pipe which is adapted for conveying hot rivets and like articles, a plurality of branch distributing-pipes, a switch-box connecting the main and the branch pipes, a switch within said box, a spring for normally holding the switch so as to connect the main with one of the branch pipes, and electrical means for moving the switch to connect the main with another of the branch pipes.

8. In a device of the character described, a pipe through which rivets and like articles are adapted to be forced by fluid-pressure, and a receiver for the rivets connected with said pipe, said receiver having a tubular extension for telescoping the end of the pipe, and a block of resilient material mounted in the receiver opposite the extension, for the purpose specified.

9. In a device of the character described, a pipe through which rivets and like articles are adapted to be forced by fluid-pressure, and a receiver for the rivets connected with said pipe, said receiver having a tubular extension for telescoping the end of the pipe, a block of resilient material mounted in the receiver opposite the extension, for the purpose specified, and openings cut in the wall of the receiver near the bottom through which the rivets may be removed from the receiver.

10. In a system for heating and distributing rivets and like articles, a heating device, and means for conveying the rivets therefrom at a high speed and without detrimental cooling.

11. In a system for heating and distributing rivets and like articles, a furnace, means for

conveying the rivets therefrom at a high speed and without detrimental cooling, and receivers connected with the conveying means into which the rivets are deposited.

12. In a system for heating and distributing rivets and like articles, a furnace, a pipe for conveying the rivets therefrom at a high speed and without detrimental cooling, and means for creating a difference in fluid-pressure in said pipe on opposite sides of the rivet so that it will be fed through the pipe.

13. In a system for heating and distributing rivets and like articles, a furnace, means for conveying the rivets at a high speed and without detrimental cooling to an intermediate point, a plurality of conveying devices leading from said intermediate point, a switching device for connecting the conveying means with any one of the plurality of conveying devices desired, and receivers for the rivets connected with the conveying devices.

14. In a system for heating and distributing rivets and like articles, a pipe adapted for conveying the rivets, a valve for closing the entrance to the pipe, said valve having an opening which is normally out of register with the end of the pipe, a furnace for heating the rivets, &c., means for transferring the rivets from the furnace to the opening in the valve, means for rocking the valve to bring the opening into register with the pipe so that the rivet may enter therein, and means connected with the valve for admitting fluid under pressure to drive the rivet through the pipe.

15. In a device of the character described, a plurality of pipes through which rivets are forced by fluid-pressure, a single valve controlling the entrance to said pipes, a receiver in said valve for the rivets which is adapted to be brought into register with the end of any one of the pipes to drop the rivets therein, connections with said valve whereby fluid under pressure may be conducted thereto, and a port in the valve which may be brought into connection with any of the pipes at will to drive the rivets therethrough.

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

VICTOR R. BROWNING.

Witnesses:
S. E. FOUTS,
W. D. BROWNING.