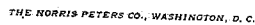


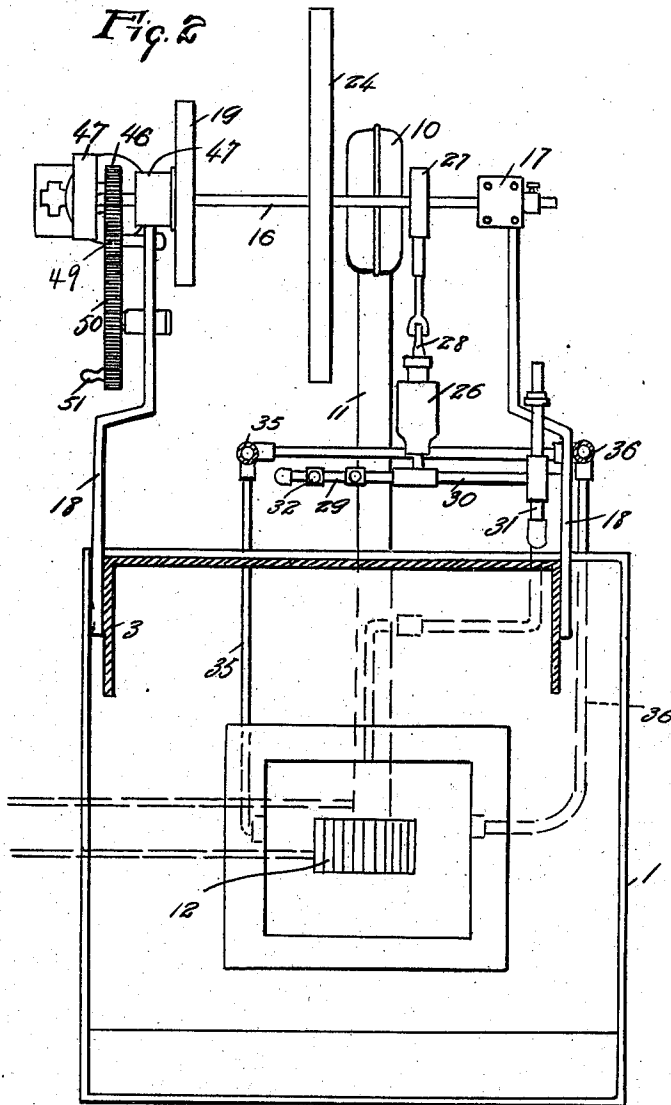
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3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.



Witnesses
S. B. Mayfield
L. J. Struett

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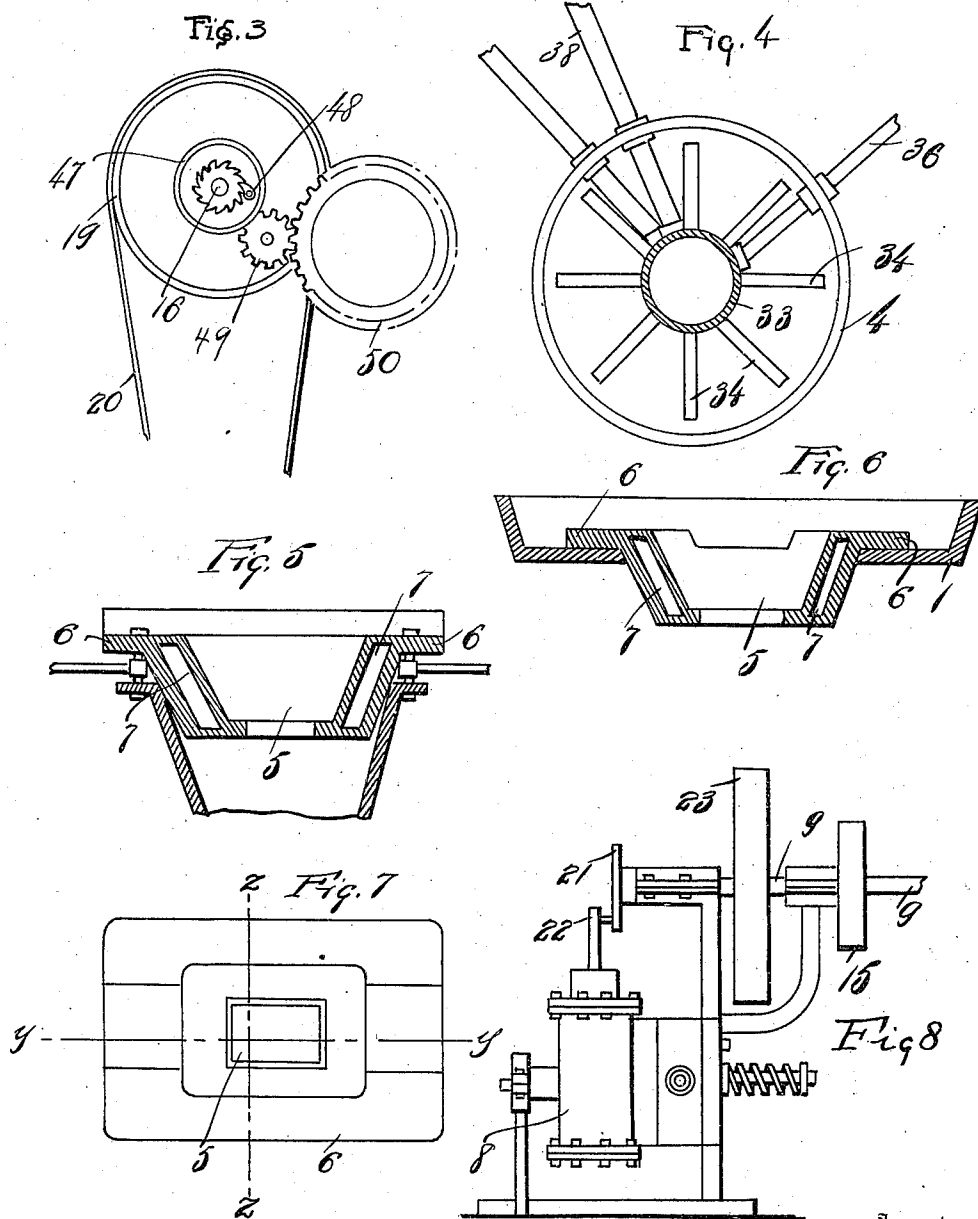
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J. H. DICKEY & W. ROACH.
AUTOMATICALLY OPERATED FORGE.
APPLICATION FILED AUG. 18, 1909.

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Patented July 12, 1910.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOSEPH H. DICKEY AND WILLIAM ROACH, OF FORT WORTH, TEXAS.

AUTOMATICALLY-OPERATED FORGE.

963,877.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed August 16, 1909. Serial No. 512,962.

To all whom it may concern:

Be it known that we, JOSEPH H. DICKEY and WILLIAM ROACH, both citizens of the United States, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented certain new and useful Improvements in Automatically-Operated Forges, of which the following is a specification.

Our invention relates to mechanism for automatically operating forges, and the object is to provide mechanism, which, after an initial starting by manual operation, will operate the forge automatically as long as there are supplies of water and fuel.

Another object is to provide mechanism for providing a supply of water without stopping the machine and to supply the water automatically.

One of the advantages of the improved machine is that a blower for a forge will be kept constantly in action without the attention of an operator.

Other advantages are that the forge can be operated economically and with great efficiency and the forge is always ready for immediate use. On this account much time is saved as work can be done almost instantly, no time being lost in raising the heat of the forge.

Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Figure 1 is a perspective view of the entire machine. Fig. 2 is a horizontal section, substantially along the line $x-x$ of Fig. 1. Fig. 3 is a detail view of the gear for initial starting of the machine. Fig. 4 is a horizontal section of the boiler. Fig. 5 is a vertical section of the fire box, taken along the line $y-y$ of Fig. 7. Fig. 6 is a vertical section of the fire box taken on the line $z-z$ of Fig. 7. Fig. 7 is a plan view of the fire box. Fig. 8 is a side elevation of the engine for driving the blower and the pump.

Similar characters of reference are used to indicate the same parts throughout the several views.

The forge is provided with a frame 1 which is supported on uprights 2. A hood 3 and smoke stack 4 are mounted on the frame 1. The fire box 5 is mounted in an

opening in the frame 1 and is supported on the frame by flanges 6. The fire box has hollow walls for containing water, the cavities 7 extending entirely around the fire box within the walls thereof. Water is placed in the cavities 7 for the purpose of making steam to drive a small engine 8. The fire in the fire box generates the steam. The engine 8 drives a shaft 9. A blower or fan 10 is mounted on the shaft 13 and connected by a pipe 11 with the grate 12 on which the fuel is to be placed. A pulley 14 is mounted on shaft 13. A pulley 15 is mounted on shaft 9. A shaft 16 is journaled in bearings 17 which are supported on arms 18 which are attached to the hood 3. A pulley 19 is mounted on the shaft 16. A belt 20 is placed on the pulleys 15 and 19 by which the shaft 9 drives the shaft 16. The engine 8 drives the shaft 9 by means of the disk 21 and link 22.

23 indicates a balance wheel. The blower or fan 10 is driven by means of a pulley 24 mounted on shaft 16 and a belt 25 which engages pulleys 14 and 24. Thus the engine 8 drives the blower 10. The engine also drives a pump 26 by means of an eccentric 27 which is mounted on shaft 16 and pivotally connected with the piston rod 28 of the pump. The pump 26 is connected with a pipe which extends in two directions. The arm 29 of the pipe extends to a water supply source (not shown) and the arm 30 of the pipe extends from the pump and connects with a pipe 31 which extends to the same water supply and also connects with the fire box 5. The pipe 29 is provided with a valve 32 for opening and closing the passage through the pipe. When this valve is open the pump simply pumps water up the pipe 31 and back to the supply source. When the valve is closed the pump pumps water from the supply source to the fire box 5. A boiler 33 is mounted in the hood 4 and provided with a plurality of pipes 34 connected therewith and radiating therefrom. The outer ends of these pipes are closed. The heat passing up through the hood 4 will heat these pipes and also the boiler. Pipes 35 and 36 are connected with the fire box 5 and with the boiler 33 so that water and steam can pass from the fire box to the boiler 33. The engine 8 is provided with an exhaust 37 and with a feed pipe 38. The feed pipe is provided with a throttle valve 39. The pipes 39 and 35 are connected by a

pipe 40 and a gage 41 for determining the height of water in the boiler is connected with the pipe 40. The pipe 39 is also provided with a pressure gage 42. A safety valve 52 is provided in pipe 38. A damper or blast gate 43 for the blower or fan 10 is mounted in the pipe 11. The fire box is provided with a blow off pipe 44. A shaker 45 is provided for operating the grate 12 to remove ashes and clinkers.

Means are provided for driving the fan and pump initially until steam has been generated in the fire box 5. A pinion 46 and ratchet wheel 47 are rigid with each other and loosely mounted on the shaft 16 and for driving purposes are locked thereto by a dog 48, when the pinion 46 is driven in one direction by a pinion 49. The pinion 49 is driven by a cog wheel 50 which is provided with a crank 51 for manual operation. The cog wheel 50 is turned until enough steam has been generated to drive the engine. The engine will then run the blower or fan and the pump, and will continue to drive the blower or fan and the pump without the attention of the operator until the water is exhausted, but a water gage 41 is provided so that the operator can tell when to change the switch valve 32 so that the firebox and the boiler will be replenished. This is done whenever necessary and without stopping the engine or blower.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent, is,—

1. A forge having a supporting frame provided with a cavity in the upper face thereof, a fire-box mounted in said cavity and provided with hollow walls, a blower connected with said fire-box, a hood mounted on said frame and over said fire-box, a boiler mounted in said hood and having double connection with the hollow in the walls of said fire-box, a pump connected with a water supply source and with said hollow, a steam engine and a pipe connecting said engine with said boiler, gearing operatively connected with said engine and with said blower and pump whereby said engine drives the blower and pump, pipes connecting said pump and said boiler, and a switch valve for turning water to said boiler or back to a water supply source at will.

2. A forge comprising a fire-box having a water cavity, a boiler positioned to be heated by the fire in said fire box and having double connection with said water cavity, a pump provided with pipes connected with said water cavity and with two pipe connections with a water supply source, a steam

engine operatively connected with said boiler, gearing operatively connecting said engine with said pump, and a switch valve for turning water to said boiler or back to said water supply source at will.

3. A forge comprising a fire-box having a water cavity in the surrounding walls thereof, a boiler positioned to be heated by the fire in said fire-box and having double connection with said water cavity, a pump, pipes connecting said pump with a water supply source and with the cavity in said fire-box and provided with a valve, a blower connected with said fire-box, a steam engine operatively connected with said boiler, and gearing operatively connecting said engine with said blower and said pump whereby said engine drives the blower and the pump.

4. A forge comprising a fire-box having a water cavity in the surrounding walls thereof, a boiler positioned to be heated by the fire in said fire-box and having double connection with said water cavity, a pump having double connection with a water supply source and a connection with said water cavity, a switch valve in said connections whereby said pump is adapted to pump water into said water cavity or to pump water from one of said water supply source connections and back to the water supply source through the other connection, a steam engine operatively connected with said boiler, a blower connected with said fire-box, and gearing operatively connecting said blower and said pump to said engine.

5. In a forge, the combination of a fire-box having a water cavity in the surrounding walls thereof, a boiler positioned to be heated by fire in said fire-box and connected with said water cavity, a blower connected with said fire-box, a pump, means for driving said pump and said blower, a double water pipe connection for said pump with a water supply source and a single pipe connection connecting said water pipe connection with the water cavity of said fire-box, and a switch valve in said water pipe connection for controlling the flow of water from said water supply source to said cavity or from the water supply source through the water pipe connection back to the water supply source.

In testimony whereof, we set our hands in the presence of two witnesses, this 26th day of July, 1909.

JOSEPH H. DICKEY.
WILLIAM ROACH.

Witnesses:

A. L. JACKSON,
A. N. EVANS.