No. 861,271. PATENTED JULY 30, 1907.

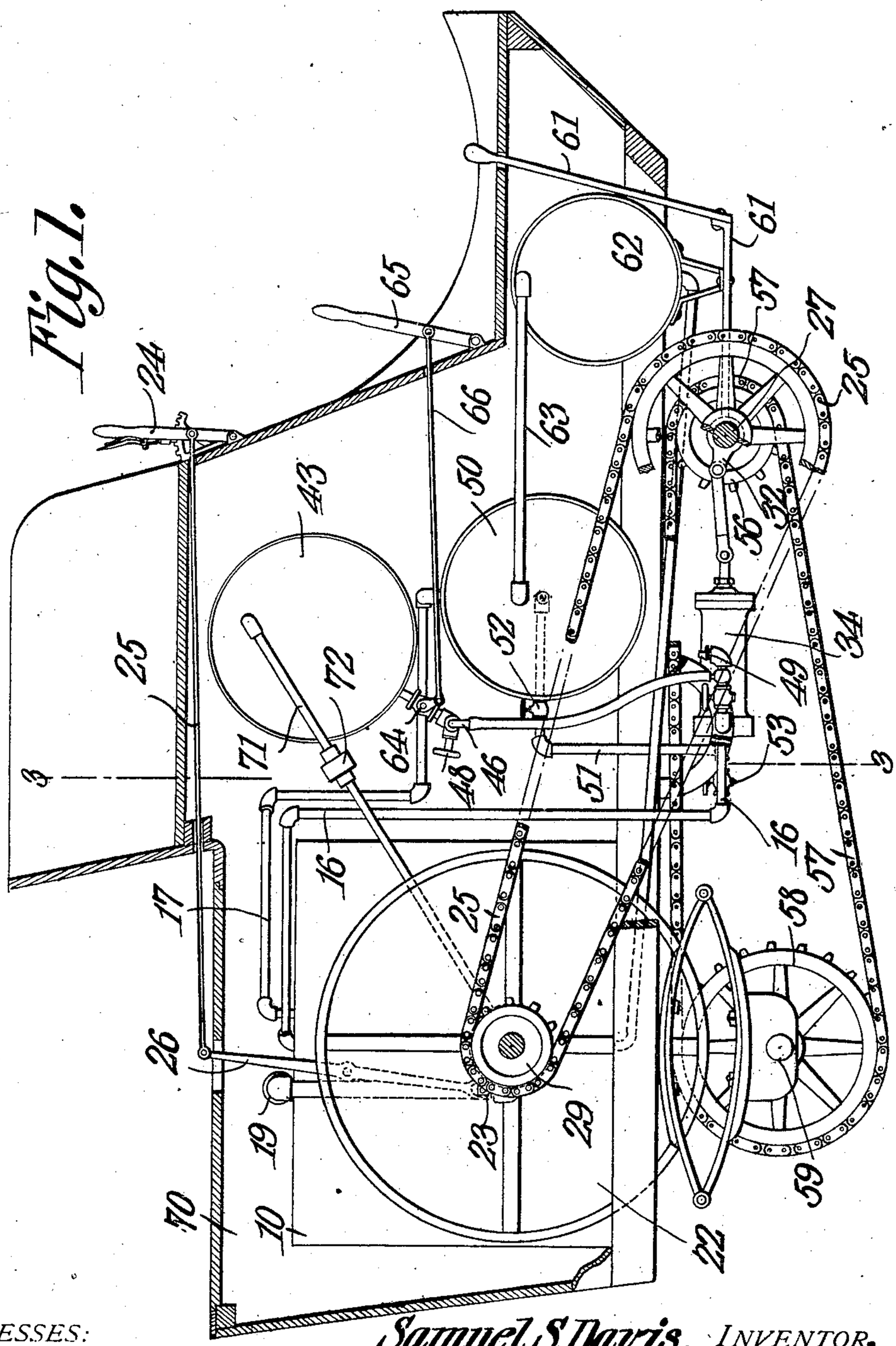
S. S. DAVIS.

FEEDING DEVICE.

APPLICATION FILED DEC. 5, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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3 SHEETS—SHEET 2.

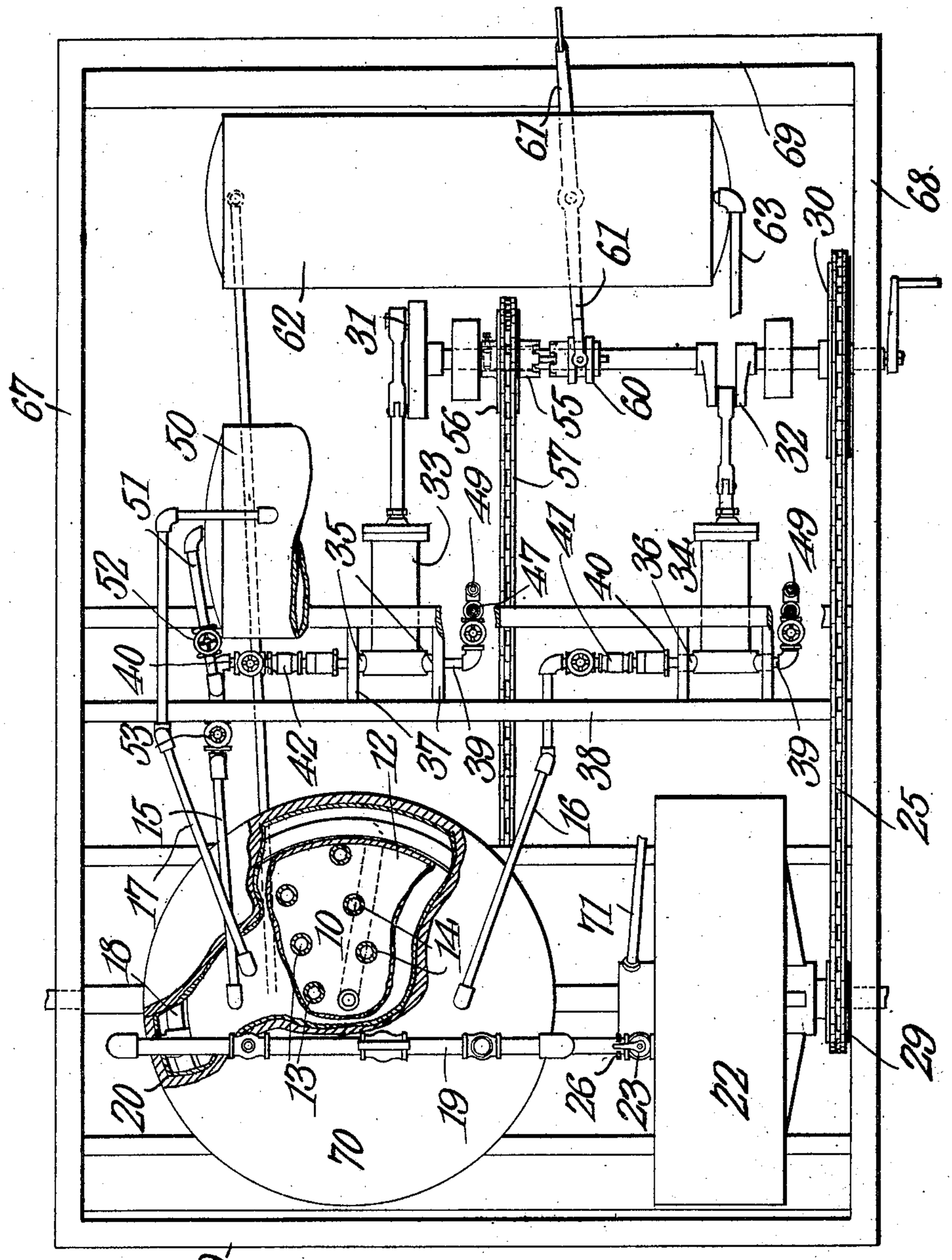

Fig. 2.

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3 SHEETS—SHEET 3.

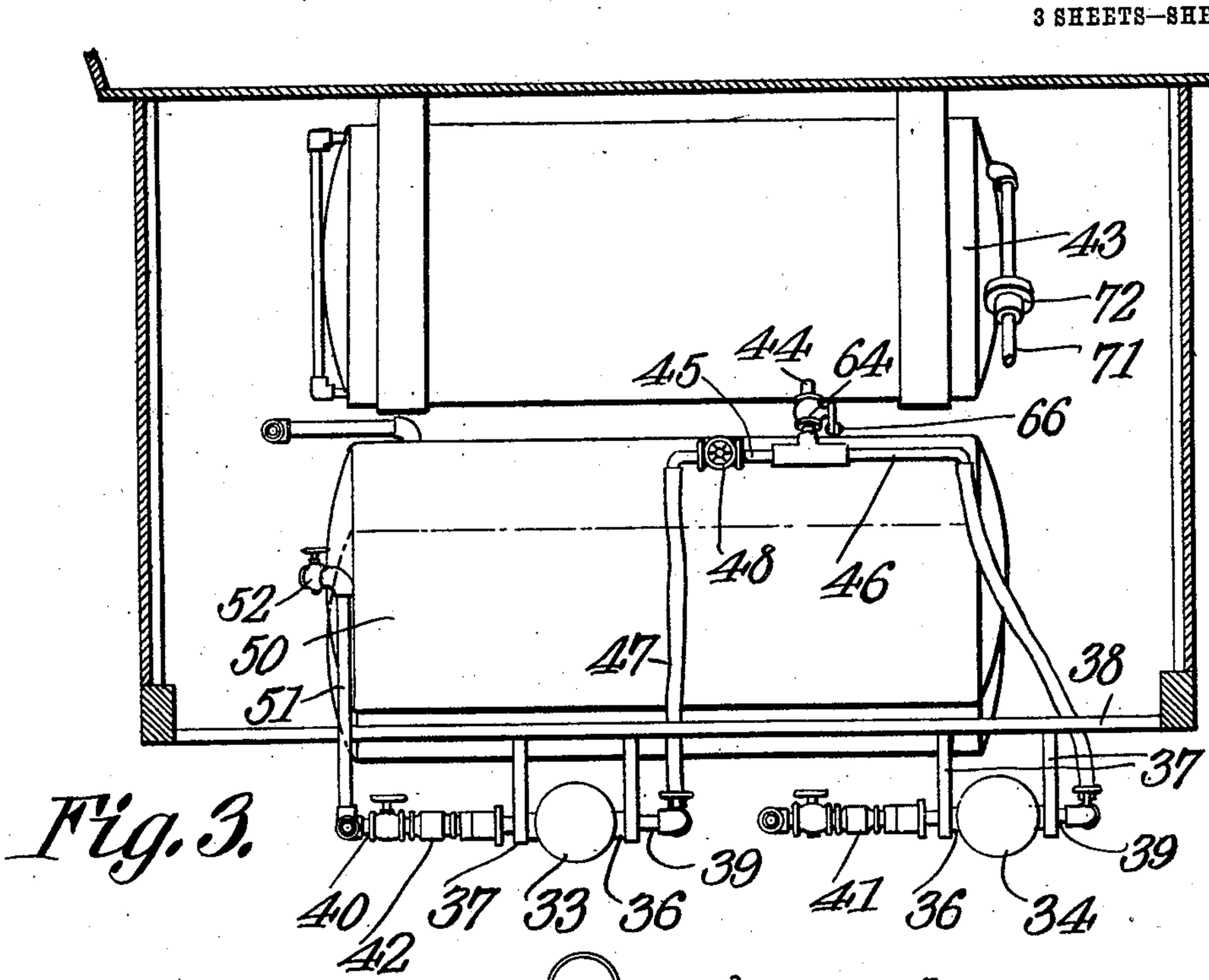

Fig. 3.

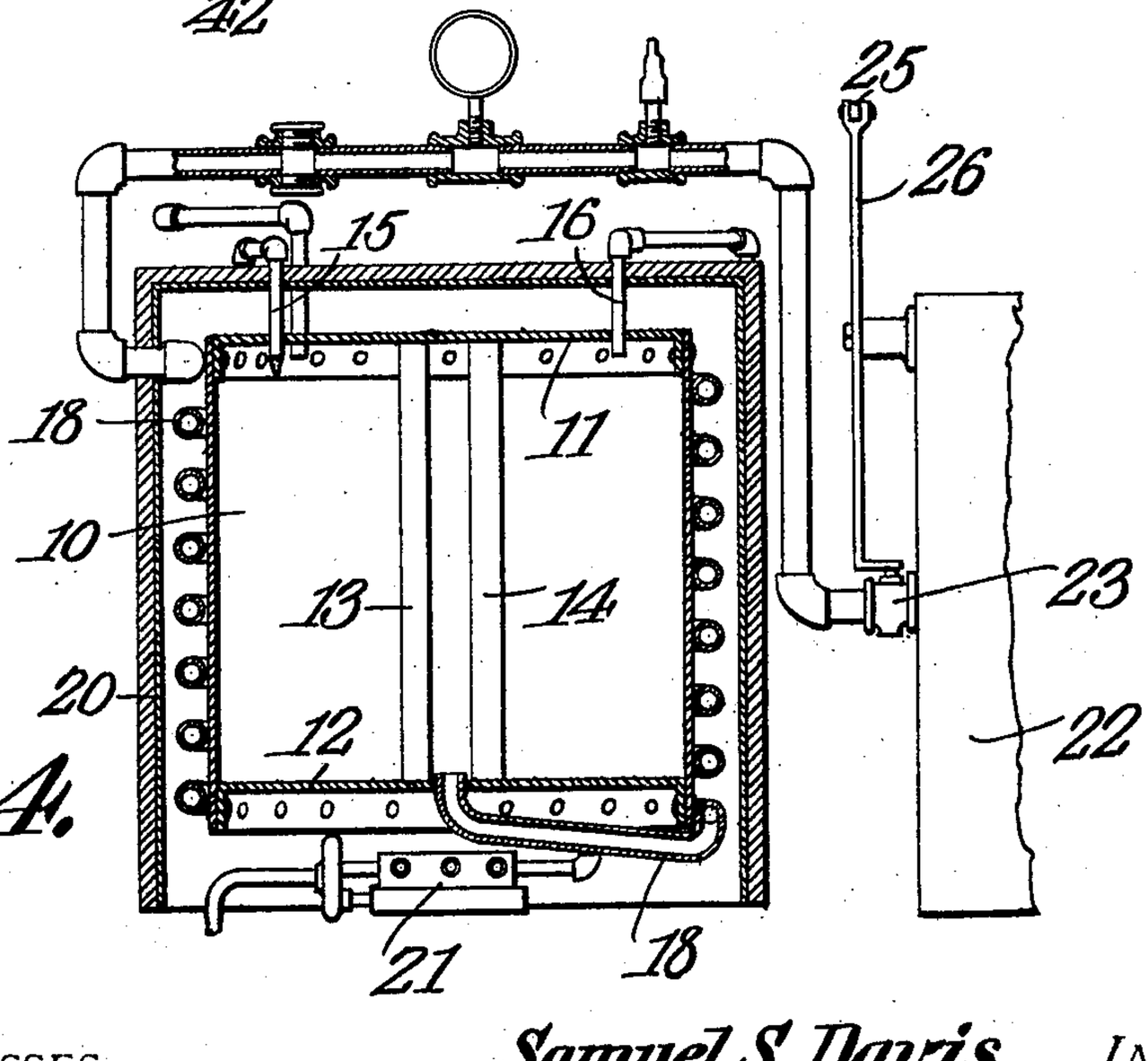

Fig. 4.

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UNITED STATES PATENT OFFICE.

SAMUEL S. DAVIS, OF SIDNEY, OHIO.

FEEDING DEVICE.

No. 861,271. Specification of Letters Patent. Patented July 30, 1907.

Application filed December 5, 1906. Serial No. 346,472.

To all whom it may concern:

Be it known that I, SAMUEL S. DAVIS, a citizen of the United States, residing at Sidney, in the county of Shelby and State of Ohio, have invented a new and useful Feeding Device, of which the following is a specification.

This invention relates to motors in general, and more particularly to the class of fluid pressure motors, the object of the invention being to provide a motor that will not be liable to explode, and which will be cheap of manufacture, durable and extremely light.

A further object of the invention is to provide a construction wherein the liquid may be volatilized with the use of a minimum of fuel, and in which the parts may be disposed in close relation to occupy a minimum of space.

A still further object of the invention is to provide a feeding device whereby water and air may be forced into a flasher in any desired quantities.

A still further object of the invention is to provide an air and water feeding device in which the water fed may be reduced and the air pumped into a retaining reservoir to be utilized in feeding the fuel and for other purposes.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a side elevation showing the complete mechanism adapted for use in a motor vehicle, parts being broken away in order to more clearly illustrate the invention. Fig. 2 is a top plan view of the mechanism with the water and air tanks removed. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a vertical sectional view of the boiler.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The present motor includes a boiler or steam generator of the type known as flashers, wherein the water is sprayed into a heated boiler, and is instantaneously volatilized by coming into contact with the heated metal.

In carrying out the invention, any suitable form of flasher may be employed, that shown in the present instance comprising an upright cylinder 10 having heads 11 and 12 to which are connected two rows of fire tubes 13 and 14 separated by a slight interspace. Through the upper head 11 of the boiler, and at opposite sides of the rows of fire tubes are passed water feed pipes 15 and 16, and through this upper head extends an air feed pipe 17.

The discharge from the boiler is through a pipe 18 which enters the lower end of the boiler through the lower head 12 and is arranged centrally of the lower head, so that the steam in passing from the boiler must first make contact with the fire tubes 13 and 14. The pipe 18 extends radially of the boiler to the periphery thereof, and is then turned into a helical coil which extends upward and closely encircles the boiler, the upper end of the coil being extended outward and connected with the supply pipe 19 leading to the engine.

The boiler is provided with an asbestos jacket 20 which completely covers it with the exception of the bottom. The side walls of the jacket extend below the bottom of the boiler, and within this lower portion of the boiler and beneath the center of the boiler is disposed a vapor burner 21 so arranged that the heat transmitted will pass upward through the fire tubes 13 and 14, and up the sides of the boiler over the convolutions of the coil 18, so that these parts will be heated to a high temperature. Inasmuch as there is no body of water contained in the boiler, the material of which the boiler is formed is heated to a higher degree than in the ordinary style of boiler, and therefore if water is forced into the boiler through the pipes 15 and 16 and into contact with the shell of the boiler and the fire tubes, the volatilization will be instantaneous and complete, bringing the pressure within the boiler up to a very high point.

The steam pipe 19 leads to any preferred form of engine 22 which, in the present instance, is a multiple piston, said pipe including a throttle valve 23 which is operated by a hand lever 24 through the medium of a connecting rod 25 and lever 26.

The engine shaft is connected to a counter shaft 27 through the medium of a link belt 25 which engages with sprocket wheels 29 and 30 on the engine shaft and counter-shaft, respectively.

The counter-shaft has two cranks 31 and 32, preferably disposed diametrically opposite each other, and with each crank is connected the piston of a pump. The pumps are shown at 33 and 34, and the pistons or plungers thereof are made of solid rods slidably mounted in the pump barrels, said barrels being provided with hollow trunnions 35 and 36, respectively, mounted in the cross pieces 37 of the supporting frame 38 of the motor. The trunnions 35 and 36 have swiveled

connections with inlet pipes 39 and discharge pipes 40, these pipes having suitable check valves 41 and 42 to insure the proper direction of flow through the pipe.

For supplying water, a water tank 43 is provided, and leading therefrom is a pipe 44 having two branches 45 and 46, the branch 45 being connected by a flexible tube 47 with the inlet pipe of the pump 33 at a point beyond the inlet check valve 41 thereof. The branch pipe 46 is connected with the inlet pipe of pump 34 at a point beyond its inlet check valve 41. The pipe 45 carries a globe valve 48 which may be turned to govern the quantity of water passing through the pipe, or to entirely cut off the flow. The inlet pipes of the pumps are furthermore provided with air inlets 49 having inwardly opening check valves, so that air may be drawn into the pumps with the water from the tanks, and also whereby when the valve 48 of pipe 45 is closed, the pump 33 may be operated to pump air alone for a purpose hereinafter described.

The discharge pipes 40 of the pumps lead to and are connected with the feed pipes 15 and 16 to force water and air under pressure into the boiler, the ends of the pipes 15 and 16 being preferably provided with suitable spraying nozzles to insure the discharge of the water in a finely divided state to facilitate volatilization thereof while the air that is fed to the boiler through the pipe 17 is supplied from an air tank 50 disposed below the water tank. This air tank is supplied by the pump 33, and for this purpose its discharge pipe 40 is provided with a branch 51 having a controlling valve 52, and in the pipe 40 between the branch pipe and the boiler is a regulating valve 53. Thus, when the valve 48 in pipe 45 leading from the water tank is closed to compel the pump 33 to pump only air, and the valve 53 in pipe 15 is closed, the valve 52 may be opened, and the air from the pump 33 will be forced into the air tank while the pump 34 will alone supply water to the boiler. When both pumps are operating, a practically continuous supply of water will be furnished to the boiler, owing to the fact that the pumps are operated by diametrically opposed cranks.

In order to provide for starting the apparatus, when there is no pressure in the boiler, a clutching mechanism and a starting crank are carried by the counter-shaft. The clutch mechanism includes a member 55 placed loosely upon the shaft and carrying a sprocket wheel 56 which is connected by a link belt 57 with a sprocket wheel 58 of the driving wheel shaft 59 of the vehicle. The second element 60 of the clutch is splined to the counter-shaft and is provided with a lever 61 for operating it. By means of this clutch mechanism the counter-shaft may be drawn into or out of operative engagement with the wheel shaft, and when out of operative engagement, the counter-shaft and therewith the pumps may be operated to establish a certain amount of pressure to force the spray into the boiler and start the mechanism.

Where gasolene or other liquid fuel is employed, it is placed in a tank 62 in front of the air tank, and has a pipe connection 63 with the air tank, whereby pressure may be applied to the liquid fuel to an extent sufficient to insure the forcing of the fuel to the burner. The water supply pipe 44 which leads from the water tank has a regulating valve 64 for controlling the flow of water to the pumps, and consequently the quantity of water supplied to the boiler, and this valve is operable by a lever 65 connected therewith through the medium of a rod 66.

As above mentioned, the motor in the present instance is shown in connection with a vehicle body, the frame of the body including sills 67 and 68 and cross pieces 69. The boiler is positioned in the box or casing 70 at the back of the body, and beneath the seat, while the tanks are disposed beneath the seat and the foot-board, the engine being located at one side of the boiler within the inclosure of the vehicle body, while the pumps are disposed beneath the vehicle, as shown in Fig. 1 of the drawing. With this construction there is secured the utmost compactness, while the engine itself, which is the only part materially injured by dust, may be completely housed and protected.

The exhaust pipe 71 of the engine leads to the water tank 43 and in said exhaust pipe between the engine and the water tank there is included a muffler 72.

The levers for opening the throttle valve and the water supply valve are hand operated, while the lever for shifting the clutch is passed through the foot-board of the vehicle.

It will be seen that the device provides an extremely simple and efficient motor, well adapted for use in propelling vehicles or boats, and wherein the speed may be regulated in such manner as to make the motor safe in the hands of unskilled persons.

I claim:—

1. In a motor, the combination with a boiler and means for heating it, of an engine operatively connected with the boiler, air and water tanks, pumps operatively connected with the engine, suction pipes for the pumps connected with the water tank, air inlets for the suction pipes, discharge pipes for the pumps leading to the boiler, an air pipe leading from the air tank to the boiler, an air pipe leading from the discharge of one pump to the air tank, valves for connecting said discharge with the air tank and boiler alternately, and a valve for cutting off connection between said pump and the water tank.

2. In a motor, the combination with a boiler and means for heating it, of an engine having a feed pipe connected with the boiler, a pump operatively connected with the engine, a water tank, an air tank, a suction pipe for the pump leading from the water tank and having a regulating valve, an air inlet in the suction pipe, a discharge pipe for the pump connected with the boiler and having a regulating valve, and an air pipe connected with the discharge pipe between the valve thereof and the pump and having a regulating valve, said air pipe having connection with the air tank, whereby the pump may be operated to discharge air and water to the boiler or to discharge air to the air tank.

3. In a motor, the combination with a boiler and means for heating it, of an engine having a feed pipe leading from the boiler, pumps operatively connected with the engine, an air tank and a water tank, a suction pipe for each pump leading from the water tank, one of the pipes having a valve for regulating the flow therethrough independently of the other pipe, an air inlet for each suction pipe, discharge pipes for the pumps connected with the boiler, an air pipe leading from the discharge pipe of that pump whose suction pipe has the regulating valve, to the air tank and having a regulating valve and a regulating valve in said discharge pipe, whereby one pump may be actuated to feed to the boiler while the other pump is actuated to feed to the air tank.

4. In a motor, the combination with a boiler and a

burner disposed to heat it, of an engine having a feed pipe leading from the boiler, pumps operatively connected with the engine, an air tank and a water tank, a suction pipe for each pump leading from the water tank, one of the pipes having a valve for regulating the flow therethrough independently of the other pipe, an air inlet for each suction, discharge pipes for the pumps connected with the boiler, an air pipe leading from the discharge pipe to that pump whose suction pipe has the regulating valve, to the air tank and having a regulating valve, a regulating valve in said discharge pipe, a fuel tank, and a pressure pipe leading from the air tank to the fuel tank, said fuel tank having connection with the burner.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

SAMUEL S. DAVIS.

Witnesses:

WM. FELTERMAN, Jr.,

FRED. FOY.